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DR. E. GUSTAV ZINKE, of Cincinnati, Ohio, a member of the Advisory Editorial Board of the *American Journal of Obstetrics and Gynecology*, well known as a teacher and prominently identified with the organization and development of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, died at the age of seventy-six, on January 30, 1922.



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No. 3

Original Communications

A CONTRIBUTION TO THE HISTOGENESIS OF OVARIAN TUMORS

BY SAMUEL H. GEIST, M.D., F.A.C.S., NEW YORK CITY

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THE question of the histogenesis of the epithelial tumors, both cystic and solid, arising in the ovary, has been the subject of much discussion. Virchow and Rokitansky ascribed them to the follicular epithelium or the Pflueger's cords, and Leopold a little later suggested the germinal epithelium as the site of origin. In the many descriptions and discussions that were published in subsequent years, various structures including the granulosa cells, rests of the wolffian body, ingrowths from the surface epithelium and the cylindrical or ciliated cell rests of Walthard, have been given prominence as possible sources from which these tumors may develop.

Recently Goodall has shown that all the parenchymatous structures in the ovary, namely, Pflueger's cords or tubules, the medullary cords, the rete ovarii, the follicle and its derivatives, are of germinal epithelial origin. Strictly speaking, then, one may trace to the germinal layer all epithelial ovarian tumors. By germinal epithelium Goodall means the epithelium covering the wolffian body which eventually gives rise to the genital gland, (ovary or testicle). However, it is still undetermined which differentiated cell of the germinal epithelium, i.e., Pflueger's cords, ray, rete, etc., gives rise to a specific group of tumors. As Goodall says, the various classifications of ovarian tumors have not as a rule been histogenetic but rather topical, clinical, or histologic.

In view of the wide variations in opinions any evidence that will at all tend to help in the classification of these common and clinically

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

important tumors and that may tend to indicate their origin is of sufficient value to make a record of it.

Through the courtesy of Dr. F. S. Mandelbaum, pathologist to Mt. Sinai Hospital, I obtained the material which furnishes the basis of this communication. The specimen consisted of a uterus and the adnexa. The patient had been operated upon by Dr. J. Brettauer, to whom I am indebted for the privilege of citing the clinical data.

The woman was fifty-two years of age and had complained of enlargement of the abdomen which had been noticed for several months. She had never been pregnant and since her twenty-ninth year had not menstruated. The physical examination of the patient showed an

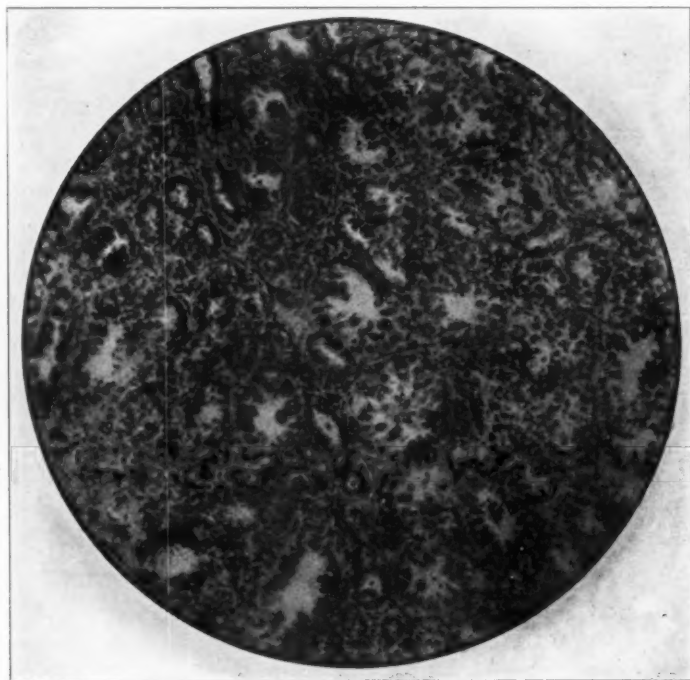


Fig. 1.—Typical adenocarcinoma of the ovary.

abdominal mass extending up to the umbilicus and apparently connected with the uterus. A laparotomy was done and a large ovarian tumor found. A complete hysterectomy was then performed.

On gross examination of the material it was seen that one ovary was the site of a rather large solid tumor, apparently a cellular neoplasm and histologically proving to be a typical adenocarcinoma (Fig. 1).

The tumor that I will describe was situated in the other ovary and because of the characteristic structure it seems possible to classify it histogenetically. The tumor was not of the type ordinarily seen in the

ovary and could not be classified in any of the commonly accepted schemes. This ovary was somewhat enlarged but maintained its normal shape and consistency. On section it was polycystic and at one extremity (the pole opposite the ovarian ligament) presented a rather dense white appearance with minute cysts scattered in a rather cellular stroma resembling the ovarian stroma. This area was approximately 3 cm. in diameter.

Histologically the dense white portion was composed of epithelial masses in a connective matrix resembling stroma of unchanged ovarian type. These epithelial masses varied from a few cells to large agglomerated and branching strands (Fig. 2).



Fig. 2.—Epithelial cell groups and strands composing the tumor.

These cell groups were composed mainly of round or polygonal cells of rather large size with much protoplasm of a somewhat granular character and containing nuclei, rich in chromatin, small, round or oval in shape, and centrally situated. The cell masses, especially the larger ones, contained cysts of varying size. The epithelial lining of the cysts varied in thickness from one or two cells to ten or more. The cells that line the cysts resemble in the main the type seen in the solid cell masses, though in the larger cysts the lining epithelial elements were cuboidal and in some instances high cylindrical, approaching very closely the high cylindrical cells with pycnotic basal nuclei

that line the loculi of the not uncommon pseudomucinous cysts of the ovary (Fig. 3). This appearance is rather important, as the histologic resemblance has a direct bearing on the interpretation of the possible origin of this type of cystic neoplasm. In most instances the cells adjacent to the cavities have a sharply defined membrane which seems to be formed by the fusion of the cell membrane forming the upper limit of this lining layer of cells.

In some of the cysts there can be seen a marked heaping up of the cells on one side while the other presents but one or two layers of cylindrical or cuboidal type. The impression is created that the cysts



Fig. 3.—Acini lined by high cylindrical epithelium of the type seen in the pseudomucinous cyst adenoma.

may form eccentrically in the solid cell nests by liquefaction or degeneration of the cells and as these small cysts form they coalesce and give rise to the larger ones (Fig. 4). These cysts appear in their earlier stages as small spaces oval or round, containing a granular or fibrillar substance and often a large degenerated cell with a sharply defined limiting membrane but with very indefinite cell structure (Fig. 5). Occasionally instead of these cells in the cyst lumen there is found a round homogeneous or granular mass which stains deeply with eosin and has been interpreted by some observers as a degenerating ovum. Careful study of all the structures found in these cysts has

failed to reveal at any time the characteristics that would make it possible to definitely identify these elements as true ova. They are in all probability secretion masses, disintegrating cells, or products of their degeneration.

This process of cyst formation or cavity formation resembles the pseudo-oögenetic process described by Goodall and in a personal communication from him after study of my slides he states, "In many of the circular cell masses there is a strong tendency to the formation of a pseudo-oögenetic process." The attempts at oögenesis can be studied from the agglomeration of a few cells into a giant cell, the



Fig. 4.—Cavities of varying size in the solid cell nests.

fusion of these and later slow destruction leaving only a circular or oval cavity filled with detritus. In many of these cell masses there are as many as eight oögenetic attempts.

The cell masses both large and small are separated from the ovarian stroma by a definite connective tissue layer, resembling the theca externa, which limiting membrane runs at right angles to the stroma proper, just as the true theca surrounds the normal follicles.

It seems that the tumor starts with the small cell proliferation and gradually as these grow, the connective tissue capsule surrounding the collections is absorbed or breaks down (Fig. 6) and so two or more cell masses fuse to form the large bizarre shaped complexes with mul-

tiple cysts of varying size. These cysts in turn coalesce until there is formed a single cyst of fair size. The process can easily be visualized as one that continues in this manner until we have the formation of a large multieystic tumor lined by cuboidal, columnar, or cylindrical cells. It has been suggested that in this manner ovarian cysts are formed, either the simple type lined by columnar epithelium or the more complicated pseudomucinous variety.

Both Pfannenstiel and Voigt have described tumors similar to the one above and suggested them as possible stages in the development of pseudomucinous cysts. On the other hand Brenner does not believe

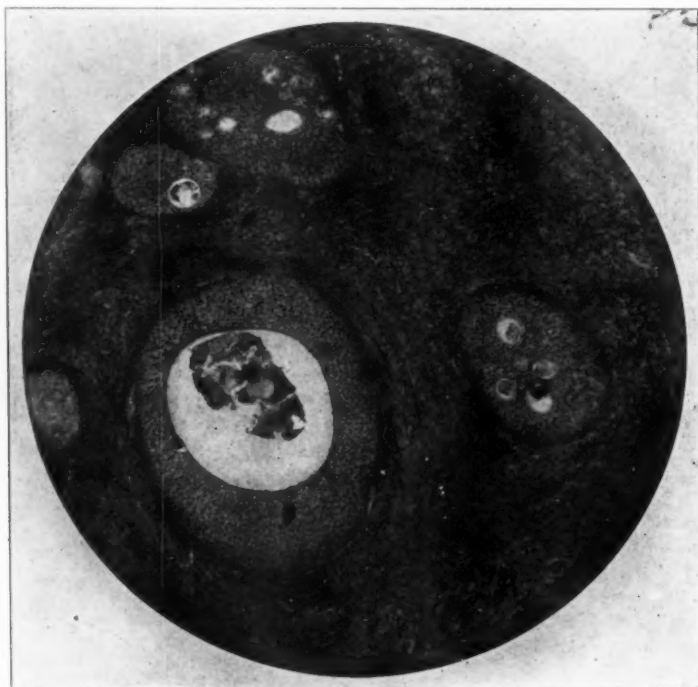


Fig. 5.—Cysts containing detritus and degenerating cells.

that these tumors form any but microcysts. In view of the fact that the tumor that I have described presented cysts lined by epithelium of the type found in the typical pseudomucinous tumors and in view of the probable method of development as we suggested it seems rational to suppose that the viewpoint of Pfannenstiel, Voigt and myself is possible.

There are no normal follicles to be seen in the tumor proper or even atretic ones. In the rest of the ovary while there were the scars of previous corpora lutea, there were no follicles seen in any stage of development. This of course in view of the age of the patient and her history of amenorrhea was to be expected. The cells in the compact

masses resemble morphologically the cells of the granulosa cells of the follicles. We have an agglomeration composed of varying layers of cells oval or polyhedral with a deeply staining oval nucleus centrally placed, the basal layers having a somewhat radical appearance (Fig. 7). The masses may remain solid with a definite limiting connective tissue capsule a structure resembling a true theca, closely simulating a follicle without an ovum. On the other hand with the development of a cavity we have a picture that mimics the true ovarian follicle. From this stage there are the variations that compose the tumor.



Fig. 6.—Cysts of varying size showing the thinning of the septa and gradual formation of larger cysts.

The question as to the histogenesis of this tumor is the point of interest. What type of cells in the ovary can give rise to a tumor that so closely mimics the follicles and also possesses the potentiality of reproducing so varied a picture and so divergent structures?

We know from the work of Goodall that there are found in the ovary structures whose origin can be traced to the original germinal cell layer of the fetus and that these structures located in the medullary cords or rete have the potentiality of developing follicle-like structures and of reproducing all the characteristics of the true follicle, even to the extent of imitating the oögenetic processes. In a personal

communication from Goodall he stated "the growth can be seen in any of the following stages, simple glandular growth, racemose glands with tall columnar cells in a single layer, gland acini with many layered cuboidal cells, solid masses of circular cells with much protoplasm, resembling an endothelioma or perithelioma and other circular masses of granulosa-like cells. This leads us to the presumption that can give rise to so many variations in growth, it is a cell of great potentiality and primitive characters, that is a cell from the parenchyma of the ovary."

The tumor under discussion does not present the characteristics of

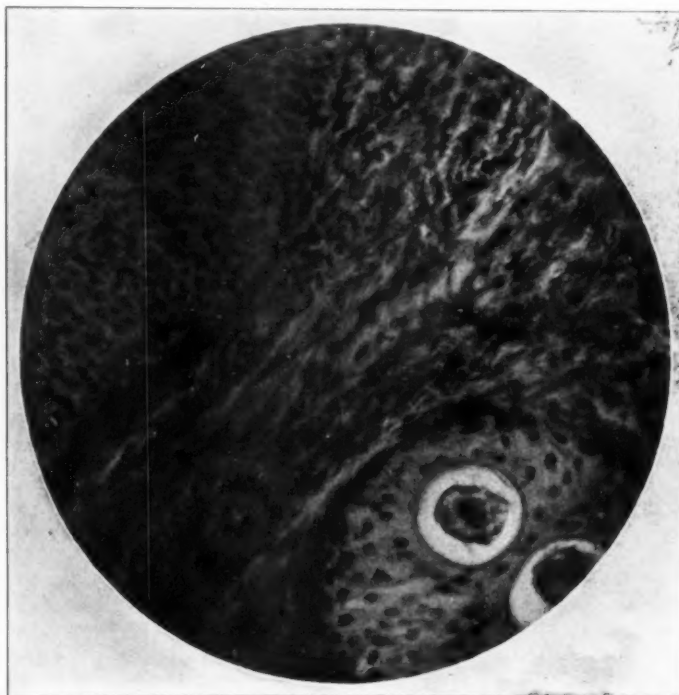


Fig. 7.—Edge of two cell nests, one showing small cavity with degenerating cell, the other showing polyhedral cells with radial arrangement resembling the granulosa layer of a follicle.

a malignant tumor. There is no tendency to invade the rest of the ovary, there are no mitotic figures to be seen, the individual cells are well-developed, normal-appearing structures with no abnormalities in the nuclei, and the entire structure of the growth is orderly. However, I agree with Goodall that a tumor with so many variations must arise from cells with primitive characteristics. This would preclude the possibility of origin from any of the mature cells of the ovary or follicle such as the granulosa cells of the primordial follicles as in these elements the potentiality is limited. Pflueger's cords might be con-

sidered as a possibility except that these structures rarely persist for so long a time in the ovary and furthermore the cells composing them give rise to one structure only, the follicle. It would seem that the cell rests from the original germinal epithelium that one finds in the medullary rays or rete as described by Goodall are the only possible source of a tumor with such wide variations as we have described. Further it would seem that these developmental anomalies may be the source of origin of the other forms of cystic ovarian tumors.

To recapitulate: In the ovaries of a woman fifty-two years of age were found on the one side a typical adenocarcinoma and on the other a process involving the greater portion of a somewhat enlarged ovary that also resembled a new growth. It is composed of masses of cells varying in number either isolated or in large branching strands. The cells in these solid masses resemble those of the granulosa layer of the follicle. In these masses are found cysts of varying sizes lined by cells of a cuboidal, columnar or the high cylindrical type as seen in the pseudomucinous type of ovarian cyst. Often in these cysts are found oval granular bodies which on superficial examination might be taken for degenerated ova but which are undoubtedly degenerated tumor cells or secretion masses. The origin of this process is the point of interest. It seems to be independent of the tumor of the other side, first as it bears no histologic resemblance to it, and second as it has none of the distinguishing criteria of a malignant tumor. The stroma resembles that of the unchanged ovary and is a predominant part of the process. The stroma and cells always maintain a definite relationship and at no point is there a proliferative or invasive tendency or an inflammatory infiltration. Mitoses were not found.

The cells composing the tumor resemble in their appearance and arrangement the granulosa cells and the general structure of the growth in parts suggests the developing follicle with many variations. Because of this morphologic appearance, the arrangement of the tumor and the wide variation in its structure, it is suggested that a cell of great potentiality must play the rôle of origin. Such a cell type we find in the embryologic rests that have been described by Goodall.

In addition the development of cysts which form by degeneration of the larger cell masses and grow by coalescence suggests this as one method of development of the microcysts and later of the larger cysts that occur in the ovary. Furthermore the cells lining these cysts are often cuboidal and occasionally high cylindrical mucin containing elements and can be traced by direct observation from the large cell masses of granulosa-like cells. This leads us to the presumption that some of the so-called simple cysts, follicular cysts and even the more complex pseudomucinous cysts may be the products of these same embryonal remains.

The nomenclature employed for the classification of this type of tumor is still indefinite, as each writer has selected a name that has fitted his theory of origin or the fancied resemblance to some structure of the ovary. At the present time there are tumors similar to the one above described that have been termed adenoma of the graafian follicle, folliculoma malignum, carcinoma folliculoides, oöphoroma folliculare, and folliculoma. Von Werdt described a group of tumors in which are included several somewhat similar to the above-mentioned type and has called them granulosa cell tumors. Several of the names can be discarded, such as adenoma of the graafian follicle, folliculoma malignum and carcinoma folliculoides as the tumor is neither a malignant tumor nor an adenoma. Personally I believe that the best way to classify these tumors is not to give them a name but to group them as tumors arising from persistent embryonal structures.

I wish to thank Dr. F. S. Mandlebaum, director of the laboratory, for the excellent microphotographs.

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THE ACTION OF EMETINE HYDROCHLORIDE UPON THE UTERUS*

BY PAUL MARTIN, M.D., (BRUSSELS), BOSTON, MASS.

From the Pharmacological Laboratory of Yale University School of Medicine.

IN Central Africa a few years ago I treated a white woman, in the sixth month of pregnancy, suffering from a dysenteriform enteritis (without amebae in the stools). Not responding to ordinary treatments she was given for three consecutive days one hypodermic injection of one grain of emetine hydrochloride. The drug had no action upon the enteritis and on the morning following the last injection, my patient went into labor and aborted the same evening. This suggested to me to test the action of emetine upon the uterus.

Since the work of Vedder¹ and of Rogers,² emetine has been the object of many experimental and clinical studies among which the following relate especially to the action of this drug upon the smooth muscle of the uterus.

Maurel,³ who published the first experimental work on emetine, apparently performed no experiment upon the uterus. He, however, made the following suggestions after observing that smooth muscle is more sensitive to the action of emetine than any other tissue of the body: "By its action upon the smooth muscle of the uterus it must be able to control hemorrhage and perhaps to facilitate labor. But it must be able, too, in large doses, to cause abortion."

Nielson⁴ states as a result of tests upon the pregnant and the non-pregnant guinea pig's uterus "it may be said that emetine apparently does not influence the tonic contractions, while it does seem to increase slightly the number and the volume of the rhythmic contractions."

Pellini and Wallace⁵ experimented also with the isolated uterus of the guinea pig; they found on adding emetine to the fluid no change in uterine movement except a slight increase in tone.

In the present investigation we studied:

- (1) The action of emetine hydrochloride upon the pregnant and the nonpregnant isolated uterus of the rat, dog, and rabbit.
- (2) The action of emetine upon the pregnant and nonpregnant uterus of living animals (dogs, rabbits).
- (3) We tried to produce abortion in rats by injecting emetine hypodermically.

*The expenses of this research were defrayed from a grant from the Therapeutic Research Committee of the Council on Pharmacy and Chemistry of the American Medical Association.

1. EXPERIMENTS WITH THE ISOLATED UTERUS

Our method was similar to that used by Dale⁶: A 100 c.c. beaker filled with Locke's solution was immersed in a larger vessel containing water kept at a constant temperature of 39° C., affording in the beaker a constant temperature of 37.5° C.

A constant flow of oxygen was kept bubbling through the Locke's solution by means of a glass tubing reaching the bottom of the beaker.

One end of the uterine muscle strip was fastened to the glass tubing in the bottom of the beaker, the other end being connected with a lever. Although the organ was prepared immediately after excision, a delay of about a half hour usually ensued before relaxation to a constant level occurred and regular rhythmic contractions were established.

The drug was added after a period of about ten or fifteen minutes of regular contractions.

The concentrations used were: 1/100,000; 1/20,000; 1/10,000. Emetine hydrochloride (Lily) was used in these experiments.

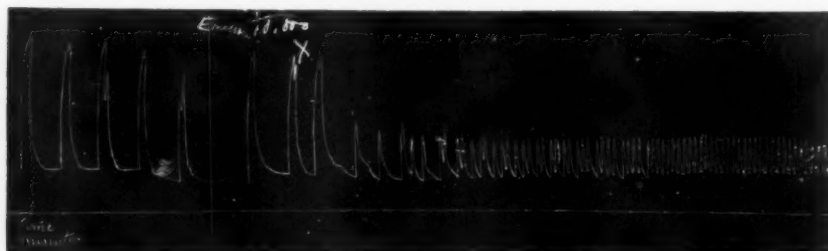


Fig. 1.—Isolated uterus of rat (nonpregnant). Time is recorded in minutes. Emetine (1/10,000) produced a decrease in the amplitude of contractions and an increase in the rate; the time being unchanged.

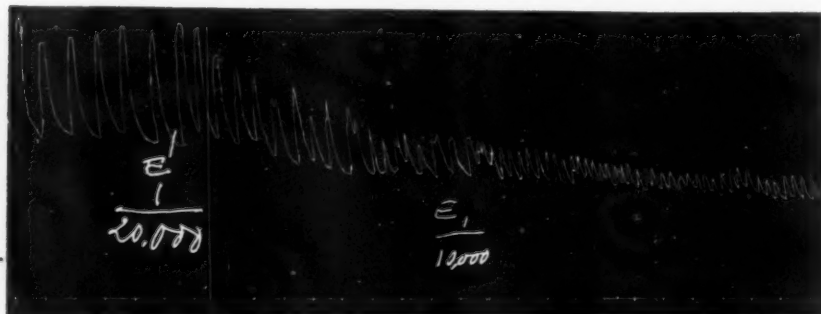


Fig. 2.—Excised uterus of rat (early pregnancy.) Shows the same as Fig. 1, plus a definite fall in the tone.

(A) *Experiments Upon the Nonpregnant Rat Uterus.*—The amplitude of contractions was found strikingly diminished, the rate much increased, and the tone unchanged. (Fig. 1 was selected from eight similar experiments to illustrate these points.)

(B) *Experiments upon the Pregnant Rat Uterus.*—The effects of emetine were found similar but there was also some decrease of the tone. (See Fig. 2, one of five experiments.)

(C) *Experiments upon the Rat Uterus During Involution.*—The



FIG. 3.—Rat 12 hours after delivery. Shows a very marked fall in the tone, a decrease in the amplitude of contractions, almost to the point of extinction and an increase in the rate.



FIG. 4.—Isolated uterus of rabbit (nonpregnant). Emetine 1/10,000 was added at the arrow. Amplitude of contractions decreased, rate increased. No effect on tone.

uterus became completely paralyzed by emetine and the tone considerably decreased. However, this was not permanent as, after fifteen minutes the contractions were resumed with accelerated rate but diminished amplitude. (See Fig. 3, one of four experiments.)

The results are summarized in Table I in which + indicates increase; (-) decrease; and 0, no effect.

TABLE I
EXPERIMENTS UPON THE EXCISED UTERUS OF RATS

STATE OF UTERUS	AMPLITUDE	RATE	TONE
Nonpregnant	(-)	+	0
Pregnant	(-)	+	(-)
In involution	(-)	+	(-)

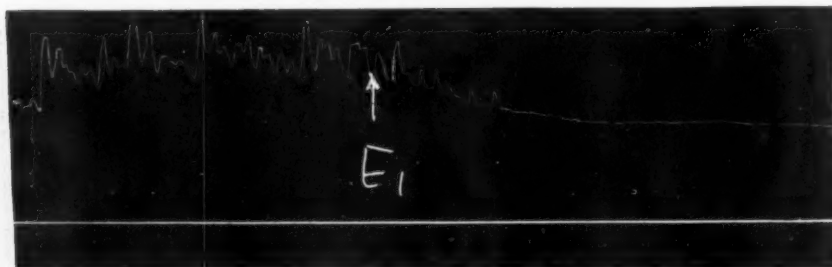


Fig. 5.—Isolated uterus of rabbit (pregnant). Decrease of tone and amplitude of contractions. (Emetine 1/10,000 added at the arrow.)



Fig. 6.—Nonpregnant isolated dog uterus. Emetine 1/10,000 was added at the first arrow. Marked fall in tone, decrease in the amplitude of contractions and increase in the rate. (There was a little friction in the middle part of the tracing which was relieved at the second arrow.)

Emetine in a concentration of $\frac{1}{100,000}$ does not markedly affect the uterus. At $\frac{1}{20,000}$ the effect of emetine is well marked; at $\frac{1}{10,000}$ the effects were always very striking.

Some Tests with Quinine.—The fact that in tropical practice one very frequently prescribes emetine for patients who are accustomed to take preventive doses of quinine brought forward the question whether the effects of emetine added to those of quinine were not able to cause a special reaction upon the uterus. A few experiments upon the isolated uterus of rats revealed:

(1) That quinine given alone ($\frac{1}{50,000}$) failed to produce any effect upon the uterus.

(2) That introduction of emetine subsequent to that of quinine ($\frac{1}{50,000}$) has the same effect as when it is introduced alone.

(3) That emetine introduced at the same time as quinine ($\frac{1}{50,000}$) has the same effect as when it is added alone.

(D) *Experiments upon the Isolated Uterus of Rabbits.*—Emetine exhibited approximately the same effect in rabbits as in rats. (See Fig. 4 (nonpregnant rabbit) and 5 (pregnant rabbit) taken from groups of respectively three and two similar records.)

(E) *Experiments upon the Isolated Uterus of Dogs.*—Results similar to the above were given with the nonpregnant dog uterus except for a depression of tone by emetine exceeding that noted in pregnant rats and rabbits. (See Fig. 6, one of four experiments.)

2. EXPERIMENTS UPON LIVING ANIMALS

Dogs and rabbits were used.

Technic.—In the first experiments a finger cot was introduced into the vagina and to record muscular activity connected with a Marly's tambour. This method had the advantage that it could be used, at least in rabbits, without an anesthetic and without sacrificing the animal. But it was soon found unsatisfactory because intestinal peristalsis and vesical contractions were sometimes recorded at the same time.

The method finally chosen was that described by Barbour.⁷ This requires anesthesia. The dogs were given 5 mg. morphine sulphate per kilo hypodermically, followed one-half hour later by 0.15 gm. of chloretone per kilo administered by means of a stomach tube. This gave a satisfactory anesthesia which lasted about five or six hours. However, the anesthesia being very light, it has sometimes been necessary to give a small quantity of ether when starting the laparotomy.

The rabbits were anesthetized with 1 gram of paraldehyde (by stomach tube).

The uterus exhibits an apparently normal rhythmic activity under these anesthetics but the possibility of their exerting some influence upon the action of other drugs cannot be overlooked.

After anesthesia was obtained, usually a half hour after the chloretone was given an abdominal incision was made in the median line directly above the pubis for a distance of about 8 cm. The contents of the bladder were expressed. Then the two horns of the uterus were cut between two ligatures, near the ovaries. The broad ligaments were then dissected gently in order to liberate the uterus without injuring the blood vessels. A glass cylinder of about 10x2.5 cm. was inserted in the wound and the abdominal wall sewed around it.

The uterus was connected with a lever by means of a thread which passed through the cylinder. Warm albolene was poured into the abdominal cavity until it filled the cylinder.

The carotid blood pressure was recorded; emetine was injected through a cannula inserted into the femoral vein.

A. Rabbits.—With nonpregnant rabbits the result obtained was opposite to that recorded with the excised uterus. Emetine (2 mg. per kilo) gave an increase in the uterine tone and did not seem to influence the amplitude and the rate of contractions. (See Fig. 7, one of four experiments.) No experiments were performed on pregnant rabbits.

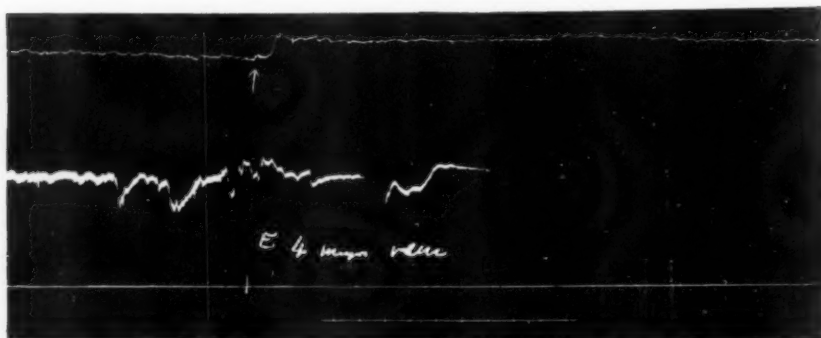


Fig. 7.—Nonpregnant rabbit, 1700 grams (intact uterus). Four mgs. of emetine were injected at the arrow. The injection was followed by an increase in the tone of the uterus.

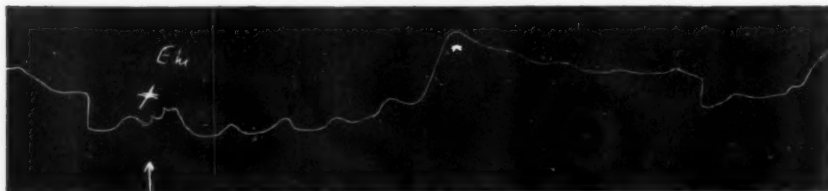


Fig. 8.—Nonpregnant uterus of dog *in situ*. Shows the rise in tone caused by an intravenous injection of emetine (1 mg. per kilo).

B. Dogs.—(1) Nonpregnant Uterus. The only change obtained was an increase of the tone. There was no marked change in the amplitude and the rate of contractions. (See Fig. 8, one of six similar records.)

(2) Pregnant Uterus. Here also an increase of tone was seen in each of the three cases tested. The amplitude also usually became slightly increased, the rate remaining approximately the same.

3. INJECTIONS IN UNOPERATED PREGNANT RATS

Hypodermic injections of fairly large doses of emetine were given to pregnant rats with the intention of determining whether abortion could be provoked. "Timed pregnant rats" supplied by the Wistar Institute were used. In one series each animal was given a single dose

of 2 mg. of emetine hydrochloride. In another series two 1 mg. doses were injected in each rat on two successive days.

The results are tabulated as follows:

TABLE II
FIRST SERIES. (SINGLE 2 MG. DOSE OF EMETINE)

RAT NO.	STAGE OF PREGNANCY	WEIGHT	DATE OF INJECTION	RESULTS
1	14 days	210	1- 6-21	Died on 1-8-21. Vaginal hemorrhage. Uterus removed several hours after death showed microscopically an aborted fetus.
2	18 days	240	1-22-21	No effect. Delivered at term of pregnancy. (22d day.)
3	14 days	200	1-23-21	No effect. Delivered at term of pregnancy. (22d day.)

SECOND SERIES. (TWO 1 MG. DOSES OF EMETINE ON SUCCESSIVE DAYS)

RAT NO.	STAGE OF PREGNANCY	WEIGHT GM.	FIRST INJECTION	SECOND INJECTION	RESULTS
1	16	...	1- 8-21	1- 9-21	No effect. Delivered at term.
2	18	220	1-22-21	1-23-21	" " " " "
3	19	240	1-23-21	1-24-21	" " " " "

Thus the attempts to induce abortion with nearly lethal doses failed except in the one case which ended fatally. Here the uterus was not removed until five hours after death so that the histopathology may have been due to some postmortem uterine change. Furthermore, since this occurred on the fourteenth day of pregnancy it is most probable that if the emetine was responsible for the abortion similar results would have occurred in the other rats, which were in a more advanced stage of pregnancy.

DISCUSSION

The most important finding in this work was that the action of emetine upon the uterus differed *in vitro* and *in vivo*.

The failure of the uterus *in vivo* to relax after emetine can be accounted for by the probability that by the time the organ was reached by the drug an effective concentration (such as $\frac{1}{20,000}$) was not available. Furthermore the presence of the serum colloids is known to detract from the action of some drugs on smooth muscle.⁶

To account for the positive finding of an increase in tone it becomes necessary to seek an explanation by which some tissue or organ of the body exerts an intermediary action. My first idea was that emetine might act by an influence upon the secretion of a ductless gland. With regard to the ovary Athias⁹ claims that the uterus of a castrated female guinea pig does not exhibit any contractions *in vitro*.

I performed experiments upon three ovariectomized dogs but eme-

tine produced an increase of the tone of the uterus in these cases as in other animals. (See Fig. 9.)

Another explanation might be found in a possible indirect influence by the adrenal secretion, but two adrenalectomy experiments gave no positive results.

The rise in uterine tone seen *in vivo* is always accompanied by the

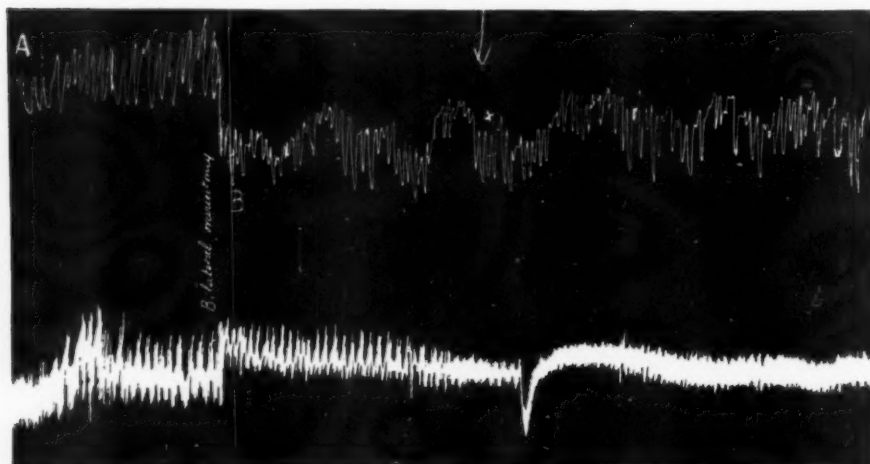


Fig. 9.

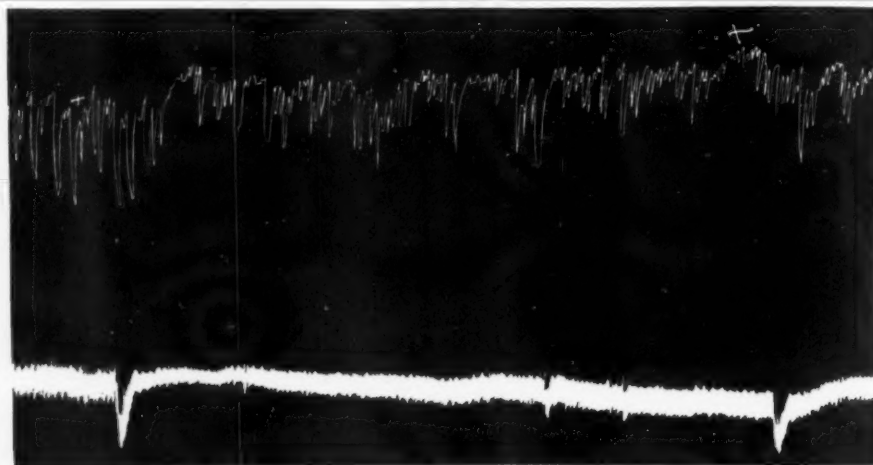


Fig. 9. (Continued)

Fig. 9.—Dog (intact uterus). The first part (A) of the tracing shows the normal activity of the uterus. The second part (B) shows the uterine movements after bilateral ovariectomy has been performed. Emetine (1 mg. per kilo) was injected at the crosses. There is a slight increase in tone after each injection.

secondary blood pressure rise so that it may be due to stimulation of the medulla, analogous to the emetic action of emetine. Another plausible hypothesis is that emetine may act by stimulating some (non-

peripheral) part of the sympathetic system. The nerve physiology of the uterus is not, however, clearly enough defined to allow of further speculation on the matter.

CONCLUSIONS

1. *In vitro* emetine lessens the activity of pregnant and nonpregnant uterus (dogs, rats, rabbits). It causes a decrease in tone and amplitude although increasing the rate of contractions.

2. *In vivo* emetine causes an increase in the tone of the uterus both pregnant and nonpregnant (dogs and rabbits).

3. Emetine probably does not act as an abortifacient in rats.

4. Emetine might be tested with caution in the treatment of metrorrhagia and menorrhagia owing to the fact that it increases the tone of the uterus *in vivo*.

Professor H. G. Barbour, in whose laboratory this work was performed, gave many valuable suggestions and advice and had the kindness to revise the manuscript. We beg him to accept our best thanks.

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CARCINOMA UTERI*

BY CHARLES L. BONIFIELD, M.D., CINCINNATI, OHIO

CANCER is still the most dreaded of all diseases. Cancer of the uterus is one of the most frequent and at the same time one of the most fatal and most disagreeable manifestations of this disease. Its treatment still leaves much to be desired. We have two other papers on the program on this subject, one dealing with its treatment by radium, and the other with the extending of the radical operation for its surgical removal. I will simply speak of a few points, with which I have been impressed as a result of my own medical experience, and the observation of the work of others.

The cause of cancer has not yet been determined, but there are two factors in its etiology that have impressed every observing clinician, as being very important. The first is the age of the patient at the time cancer occurs, and the second is chronic irritation. The period at which cancer of the uterus is most prone to occur begins about forty, and ends about fifty-five. Many cases are seen in earlier life, many later, but this is the real cancer age. It cannot be emphasized too strongly or too frequently that the patient should be brought to that period of her life in the best possible condition, physically, particularly as regards her uterus. Therefore, all lacerations of the cervix that produce any irritation at all should be repaired, and if a chronic endometritis exists, it should be cured before this period arrives.

The next point I wish to emphasize is that for a number of years we have been trying to preach to the laity the danger of cancer, and in this way to get to operate and treat cancer in its earliest stages, but that our efforts have not produced the results which we hoped. To my mind there is some objection to carrying on the propaganda as it has been carried on in the past. Something like a year ago, we had "Cancer Day," in Ohio, and a number of Protestant pulpits in Cincinnati were filled with speakers on cancer. I know of at least one instance where a woman fainted, and had to be carried out after hearing a discussion on this subject by one of the speakers, and many more were so frightened that the talks did them no good. I maintain that to arouse hysteria in regard to these things is folly, and does not bring results.

The thing I wish to suggest instead of this, is that every woman who has borne children, and therefore has the strongest predisposition

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or the strongest predisposing cause that we know of, when she reaches the age of thirty-five or forty should go to her family physician and be examined to see if any symptoms of cancer are manifesting themselves. It is necessary for us to go to our dentists every six months in order to save our teeth, and so it certainly seems worth while for the woman to subject herself to this little inconvenience and expense for the purpose of saving her life.

It has been my experience, and I believe that of most of us, that 75 per cent of the cases of cancer that come into the office are already so far advanced that the hope of permanent and complete cure has already gone by.

The next point I wish to speak of is the treatment. I think this might be divided into four methods; cautery, x-ray, radium and surgery. The cautery is one of the oldest treatments and has given good results, but it is not applicable to all the cases and has not become very popular. The same may be said of the Percy treatment by heat. The x-ray I believe is capable of further development, and I have great hopes that some time it will be a more powerful remedial agent than any we have at present. I understand that in Germany they are making tubes that will make it more potent, but at present it does not, in my opinion, answer the purpose as well as other methods.

In some places, the most popular and to some people the most attractive treatment is radium, but the very expense of this treatment will for many years to come, prevent its applicability to the vast majority of cases of cancer of the uterus, but this to me is not a very depressing fact because I still believe that the thorough removal of cancer by the surgeon is the best treatment that has yet been devised. Just what the procedure shall be must depend upon the judgment of the surgeon into whose hands a given patient falls. When we first operated for cancer, the vaginal hysterectomy was done, and by and by the operation was extended and extended as we became more radical, and of late years, we have been preaching and practicing that the radical operation should be limited to those cases in which we feel very sure that we are able to remove the disease in its entirety. I concurred in that belief for many years, but my observations in recent years have convinced me that I was mistaken. Up to that time when a case came to me, that I regarded as inoperable for thorough cure, I was satisfied to curette away the tissue as far as possible and then cauterize with the actual cautery, following that with applications of formaldehyde. I relieved these patients somewhat and prolonged their life, but all the time these patients knew that the disease was still there. The psychologic effect was bad and death followed, preceded by those dreadful complications such as vesicovaginal and rectovaginal

fistula. In operating I occasionally made mistakes. I thought when I examined a patient, I would be able to do a complete hysterectomy, but when I opened the abdomen, I found I could not get quite all the disease. Observation has convinced me that my mistake was a fortunate one for the patient, for she lived longer than the others, and when she died, she passed away with less discomfort.

Such cases have now become sufficiently numerous to convince me that my former teaching and practice was a mistake, that wherever it is at all practical to do a hysterectomy, it should be done. These are the points that I particularly wish to emphasize, but I also wish to say: The advocates of radium claim that if they do not cure the patients, they relieve the pain, and they die happily. It has been my fortune or misfortune, to see a number of cases dying after treatment by radium, and one of them, I think, died the most miserable death of any patient with cancer of the uterus that has been under my care.

409 BROADWAY.

(*For discussion, see p. 312.*)

SOME PHASES IN THE EVOLUTION OF THE DIAGNOSIS AND TREATMENT OF CANCER OF THE CERVIX*

BY ROLAND E. SKEEL, M.D., F.A.C.S., LOS ANGELES, CAL.

ONE who peruses the literature of the preceding century in a search for data on cancer of the cervix, is likely to be the victim of conflicting emotions when his labor is completed. He will be deeply impressed by the magnificent advance which the profession has made in its knowledge of pathology, the prevention of infection, and improvement in operative technic; and as profoundly depressed by the absence of corresponding improvement in the ultimate mortality rate of the disease.

It was my intention in planning this paper to consider the diagnosis and treatment of cancer of the cervix in four principal epochs of the last one hundred years; first, the preanesthetic; second, from the discovery of anesthesia until the time of general adoption of antiseptic methods; third, from the preceding until the publications of Wertheim's panhysterectomy; and fourth, from the latter to the present, a time when it is felt that a new era is dawning, one which is likely to persist until the discovery of the ultimate cause of cancer leads to the development of a positive cure.

Somewhat to my surprise there appeared to be no significant change either in methods of operation or the results obtained following the

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general introduction of anesthesia; and operations for cervical cancer were denounced, thereafter, in almost the identical language used before, excepting that the term painful occurred less frequently. So the plan of study was changed to make the first era extend to the time when aseptic and antiseptic principles were universally adopted, i.e., the 1880-1890 decade, the second from 1890 to 1907; the third from 1907 to 1921.

Diagnosis and treatment are considered together since, at least, some of the improved results of modern treatment can be conclusively traced to earlier and more accurate diagnosis as well as more effectual treatment. It also seems logical to begin our study with the opening of the last century; for while there had been casual mention of operative procedures for the relief of cancer of the cervix for many years, the first systematic attempt at amputation of the cervix seems to have been made by Osiander in 1802, at vaginal hysterectomy by Sauter in 1822, and Langenbeck's first abdominal hysterectomy was performed in 1825.

At this time the diagnosis of cancer was accomplished by clinical methods only; and while the microscope was occasionally employed for the study of pathology, there was no definite demonstration of the difference between the minute anatomy of cancer and other new growths. The microscopic differential diagnosis of early cancer was unknown.

As late as 1857 Churchill¹ wrote: "As our microscopic knowledge increases we may arrive at some definite distinctive mark by which to recognize the disease," while ten years earlier J. Hughes Bennet² read a paper on "The more exact diagnosis of cancer by the use of the microscope," in which he said: "we are only on the threshold of inquiry. What may we expect when surgeons are more extensively assured of the diagnosis?" At this same period, 1850 and thereabouts, Rokitansky and Virchow definitely established cellular pathology and the pathology of cancer. Paget's *Surgical Pathology*, published in 1865, gives the minute anatomy of cancer practically as we know it today; while the method of transmission and metastasis to other areas is erroneously attributed to the blood stream.

During the latter part of the preantiseptic era other lesions which had not been considered to be true cancers, especially that condition known as canceroid, were gradually recognized as being of a genuinely cancerous nature. The earliest and most thoroughgoing emphasis upon the epithelial character of the cancer cell and the diagnostic importance of its minute anatomy by any English writer of renown, was made by Lawson Tait³ in 1879.

It is interesting to note that long before Emmet's discovery of laceration of the cervix, the prevalence of cancer of the cervix in women who had borne many children and those having had many difficult

labors, was not only known, but given almost universal recognition, and this explanation for the greater frequency of cervical cancer in Europe than in America is mentioned by more than one writer of the period.

As regards prognosis and treatment, it is also interesting to note the same occasional recovery after the use of some simple or bizarre remedy, and the same discrepancy of opinion as to whether any case actually made a permanent recovery that we find at present; the pessimistic note gradually diminishing towards the end of the era.

Deweese⁴ in 1847, says that "Our duty in the treatment of uterine cancer is to mitigate suffering which we cannot remove." Tait, *ibid.*, in 1879, said of cancer of the cervix that it is "the most painful and terrible disease from which mankind suffers, because nothing can be done for its cure" and that he "has never had a cure."

Emmet⁵ in 1884 said: "When at the time of operation no doubt existed as to the character of the malady it always returned."

Other writers mention an occasional cure running over a two year period, an inadequate time as we understand it today; but this mention of what we would consider uncertain cures, grows more and more frequent as operative procedures became more common and less dangerous.

During this period, also, we see a gradually increasing effort at more radical extirpation; a wave of enthusiasm for each procedure being succeeded by revulsion of feeling as improved results failed to materialize in the hands of any one aside from its sponsor.

It is difficult to avoid undue and untimely philosophizing when considering the methods of treatment in use and "there is nothing new under the sun" occurs to one's mind over and over again. Thus early writers contended that low diet and local and general venesection prolonged life. In 1842 Montgomery⁶ quite accurately described as an early type of cancer, what we now regard as laceration with cervicitis and hypertrophy, which, he said, should be treated by local blood letting and the application of nitrate of silver. Douches of chloride of lime solution were recognized as efficient deodorizers in advanced cases with fetor.

Byrne,⁷ in 1871, reported a case in which he was unable to apply his galvanocautery loop and in which a cautery knife was used instead; while Courty⁸ in 1882 advocated amputation with a peculiar shaped cautery knife made by Colin of Paris, the vagina being protected during its application by a box wood speculum.

Noeggerath⁹ in the discussion of Byrne's paper fifty years ago, announced his conviction that radiating heat destroyed cancer cells beyond the point of application and thus prevented recurrence.

From the time of Osiander's demonstration, amputation of the cervix, as a definitive method of treatment for cancer, easily maintained its su-

premacry throughout the preantiseptic era. Performed at first with knife, scissors or *écraseur*, the operation was greatly improved by the introduction of various types of galvanocautery loops and knives.

Marked palliation of symptoms and, occasionally, a permanent cure, can be said to have been the result of amputations until the time of Byrne who, first with the galvanocautery loop and later with cautery knives and dome-shaped irons, established a record which surpassed anything previously known. As early as 1871, he was enabled to report several cases without recurrence after from six to nine years.

Vaginal hysterectomy began also to have its advocates; but vaginal hysterectomy was endowed with a peculiar fatality for many years after its introduction, especially if performed with the uterus *in situ*, while the death rate was low if the uterus was prolapsed or inverted. Indeed, these two conditions were considered to be the indications *par excellence* for the operation. Until 1830, there were but ten authentic cases of removal of the uterus, *per vaginam*, and the operation was called the most serious and painful in surgery. The editor of the *Medico-Chirurgical Review* remarks at this time, "We consider the extirpation of the uterus, not previously protruded or inverted, one of the most cruel and unfeasible operations that ever was projected or executed by the head or hand of man."

Thus the dangers were so great that, in 1856, but 25 vaginal hysterectomies had been performed, with 22 operative deaths and three recurrences. In 1863, Sir James Y. Simpson¹⁰ said that "excision of the uterus is an unthinkable procedure at present;" and, in 1882, Courty wrote that "extirpation of the entire uterus and supravaginal cervix were common enough at one time to afford material upon which to base a serious opinion as to their advisability. Only the infra-vaginal cervix should be amputated and with this some cures result."

The decade 1880 to 1890, was marked by a renaissance of vaginal hysterectomy following the lead of numerous German surgeons abroad and Fenger in America.

This same decade saw a decline in abdominal panhysterectomy which had been taken up by a number of European surgeons of note, following Freund's¹¹ report, 1878, of ten operations with but five deaths. Despite this mortality, some operations continued to be performed; but vaginal hysterectomy was, at this time, so much safer that the surgical profession continued to lean towards it despite the high percentage of recurrence.

During this decade and, indeed, until his death, Byrne continued, as pointed out by Werder, to be as one crying in the wilderness, and at the time of his death he had nearly 400 cases to his credit without an operative death and with a 19 per cent permanent recovery rate.

It is assumed that all of us are more or less familiar with the

situation as it existed from the beginning of the antiseptic era until the complete development of the Wertheim operation and the publication of his studies¹² in this country in 1907, from which may be said to date the general, although by no means universal, adoption of this method of operating for cancer of the cervix.

In this era vaginal hysterectomy continued to lead other operative procedures, and the mortality was continuously lowered; but, at the same time, the safety of all abdominal operations was almost unbelievably increased through the practice of surgical asepsis. Ovariectomy, salpingectomy and hysteromyomectomy, heretofore approached with great apprehension, became so safe that recovery was anticipated as a matter of course. In view of this it is not strange that the improved results from more extensive operation and glandular excision in cancer of the breast, called the attention of several operators to the possibilities inherent in a more radical extirpation of the periuterine structures and pelvic lymph glands, so that Mackenrodt, Rumpf, Ries and Clark, in 1894 and 1895, independently evolved methods which differed somewhat in detail but not in principle. In 1898, Werder¹³ published his method of total removal of the uterus with a large portion of the vagina, and in the same year Wertheim began the study which eventuated in the operation bearing his name.

The complete development of the Wertheim operation seems to have been brought about by serial studies of the iliac glands together with a knowledge of the high ratio of local recurrence after vaginal hysterectomy. Wertheim's appearance in this country, with the publication of his statistics to date, was but the culmination of a series of events which gave the Wertheim operation its widespread vogue.

In his Chicago address, Wertheim reported 345 operations (about 50 per cent of all the cases applying for treatment). Especial attention is directed to his assertion that his early mortality was 18 per cent following a 2 to 2½ hour operation, while he was able, later to reduce this to 8 per cent for the same operation if its performance did not require more than an hour.

From 1907 to the present may be considered the Wertheim era, although Schauta continued to contend valiantly for his extended vaginal method during the early years of the epoch.

In order to obtain a correct perspective of recent developments, the introduction of statistics becomes necessary despite their known unreliability.

Fortunately modern methods of microscopic diagnosis remove one element of uncertainty in that, practically, all cases reported as cancer of the cervix are that and not something else, so that the greatest element of uncertainty does not pertain so much to the percentage of cures as to the stage which had been attained when the cure resulted, the percentage of operability reported running all the way from

Clark's estimate of only 10 per cent, applying to the University of Pennsylvania Clinic, up to Graves'¹⁴ latest figures of 64 per cent. Obviously the difference between these figures represents a difference in the material seen by each and, probably, also a different viewpoint as to what does and what does not render a case inoperable.

One may consider operation worth while even though permanent cure is improbable, while another may be taking a very broad view of the community and sociologic aspect of an operation, which, although an improvement on what has preceded it, still has so disastrous a general mortality and recurrence rate, as to frighten prospective good operative risks, thus leading them to delay examination and treatment until they, in turn, become poor operative risks; the whole constituting what might be termed a sociosurgical vicious circle. Of the writers consulted, Clark alone seems to emphasize this broad humanitarian viewpoint. Moreover the value of statistics depends upon the relation between the constant and the variable factors: When the known constant factors remain the same, multiplication of numbers tends to average the variables and leads to increasing accuracy, so that case reports running into the thousands mean something rather definite, while a few may mean much or nothing.

A comparison of results as between vaginal and abdominal hysterectomy for cancer during the past ten years would be unfair to vaginal hysterectomy, since most surgeons now choose the latter in obese patients or those obviously unable to bear the shock and hemorrhage of the abdominal operation, the bad risks, while a comparison of the two in 1900, let us say, would be unfair to abdominal hysterectomy which then was in a state of earlier evolution than the vaginal operation. A comparison of the results when each operation may have been said to be at its acme, however, is not unfair; and, counting the available statistics, gives the following results for vaginal hysterectomy: Operability 37 per cent, operative mortality 4.5 per cent; five year cures 28 per cent; absolute cures, per one hundred applying for treatment, 12.5 per cent.

Applying the same method to the Wertheim operation, Janeway¹⁵ completed the following figures. Of 5027 cases 35 per cent were operable, operative mortality 18 per cent. Five year cures 35 per cent; absolute cures, per hundred applying for treatment, 12 per cent.

A comparison of these two sets of statistics is interesting. Operability rate is nearly the same, the absolute cures are almost identical. The superiority of five year cures from the Wertheim operation, being figured on survivors of the operation, is offset completely by the greater number that succumb to this operation as compared to vaginal hysterectomy.

Some smaller but later sets of statistics serve somewhat to dissipate the gloom produced by a contemplation of figures which appear

to show that we have not succeeded in advancing very far even with the aid of what may be termed a super-major operation.

Thus Lincoln Davis¹⁶ gives, in 64 cases, an operable rate of 42 per cent; mortality rate, 11 per cent; five year cures, 42 per cent; absolute cures, 8 out of 64, again 12.5 per cent. Graves¹⁴ reports 64 per cent operable out of 189 cases or 119 operated upon with a 5 per cent mortality rate; and Cobb, in his last 30 cases, had the same mortality rate with an average of absolute curability of 18.5 per cent. Weiss¹⁸ in 1918, reporting on the Werder operation, gave 25 per cent operability, 6 per cent mortality, 45 per cent five year cures, making 11 per cent absolute cures. Faure¹⁹ says he has treated 71 by abdominal hysterectomy, 50 per cent free from recurrence; but adds that of "early cases 88 per cent survive, of late, 27 per cent."

In contemplating the subject and reading the available literature two things stand out with great distinctness. First, the mortality rate goes down with increasing experience. Thus many writers refer to their last thirty, or fifty, or one hundred cases when stating the possibilities inherent in the Wertheim operation. Second, the operative recovery rate and freedom from recurrence are enormously increased by early diagnosis and early operation. Of the importance of the latter all of us are aware and it is not my intention to go into this phase of the subject on this occasion.

Though the data do not justify so high an operability rate, so low a general mortality rate, nor so high an absolute curability rate, let us observe, in liberal round numbers, what has happened at the expiration of five years to 100 women with cancer of the cervix, if 50 per cent were operable; there was only a 10 per cent mortality rate, and 20 per cent of absolute cures. Out of 100, twenty are now well; fifty inoperables have gone on and died, all presumably having had a Percy cautery, curette and cautery, or some other form of local treatment; five of the fifty operated upon died at once, and the remaining twenty-five died from a recurrence. Of the fifty who underwent a tremendously severe painful operation, thirty were dead within five years. Were the operation less serious, less heroic, and less frequently complicated by post-operative sequelae, such a showing might be justifiable; but with the reverse true, it, in my opinion, lacks justifiability when performed upon the present indications of operability.

The Present Era.—Cobb¹⁷ says: "It is absolutely certain that radium and cautery cannot cure cancer of the cervix." Between this and the opinion of ardent radiotherapists, there is room for a wide difference of opinion, opinion which must be based upon impressions rather than large arrays of statistics, since radium has been used extensively and intelligently for too short a period to permit the completion of conclusive statistics.

Allowing for the exaggeration which attends every new method, the legitimate and illegitimate enthusiasm attaching to any new operative painless treatment, utilizing so mysterious a force as radium, there still remains the fact that radium has been used in a sufficient number of inoperable hopeless cases with results so startling as to make us pause; and, on reflection, question whether bloody means ever are justifiable in cancer of the cervix, and if so, when?²⁰

That Cobb's statement is extreme,²¹ and that radium does sometimes cure cancer of the cervix, can be proved by a limited number of cases in the records of many surgeons and radiotherapists. Personally, I have one with no recurrence after seven years following cautery amputation and radium; but it is the apparent cure of a considerable number of inoperable cases extending over two, three, four, and five years that makes it impossible to rule radium out of the field. Thus Burnam reports 30 patients without recurrence out of 200 treated by radium more than five years ago, and these were either borderline or inoperable cases. If only we knew whether late recurrence was rendered more likely after radium than after the knife, we would have some definite data for comparison; but of this we are not certain. We can at least conceive that living carcinoma cells may be imprisoned in the mass of connective tissue, left after the use of radium, to again become active many years later. That postoperative sequelae do occur after radium treatment, is well known; that an occasional death may result from overradiation in an advanced case may be granted; but there is no perceptible mortality rate in cases which are operable when measured by our present standards.

From a careful personal observation and checking up of my own results, and taking into consideration all the concomitant circumstances, I have been gradually driven to certain conclusions but, before putting them before this body, I felt it wise to obtain the opinions, pro and con, of a few distinguished authorities with much greater experience than my own, who are not members of the Association and, therefore, would not be present to give their personal views in the discussion.

Accordingly, letters were sent to W. J. Mayo, Reuben Peterson, John G. Clark, and Howard C. Taylor, asking them to criticize, favorably or unfavorably, the thesis that "Only such cases of cancer of the cervix should be submitted to the Wertheim operation, as are discovered so early in the course of the disease as to require the microscope for a positive diagnosis." At the time these letters were written the papers of Clark and Keene,²² Schmitz,²³ and Duncan²⁴ had not been published. If they had been available, Clark's opinion could have been obtained by quotation from his paper rather than by personal solicitation; and Schmitz's statement would have been presented ear-

lier in the present discussion since it so accurately corresponds with my own experience. This paragraph of Schmitz is as follows: "In my experience, almost all the patients that survived an operation for carcinoma for the customary five year limit had been either subjected to a panhysterectomy on account of unexpected microscopic findings or the recurrence and persistence of the underlying pathologic process after minor surgical procedures instituted for the correction of apparently benign disease," whereas I had endeavored to put the matter concisely by stating that in those who survived, the discovery of malignancy had been accidental.

Concisely stated, cancer of the cervix was practically hopeless until the introduction of the galvanocautery amputation by Byrne. Unfortunately this was not widely adopted and the results obtained by vaginal hysterectomy, when that operation was fully developed, were probably superior to cautery amputation alone. Certainly it was more extensively used so that many more cures resulted.

Panhysterectomy, by the Wertheim method, has in general no higher rate of absolute cure than the vaginal operation; but in the hands of the most expert it is, probably, superior to vaginal hysterectomy. All of the major operative procedures, performed upon the ordinary indications of operability, leave so large a proportion untreated, have so high a mortality rate, and such a large number of recurrences, as to have a profoundly bad effect upon what may be termed the community surgical morale; and, therefore, I wish to present the following theses for discussion, all but the first being offered in the hope of standardizing our procedures, as well as in the belief that more cures will be effected than at present.

CONCLUSIONS

1. Any expectation of an increased number of cures of cancer of the cervix by surgical methods must be based upon earlier diagnosis.
2. Panhysterectomy should be reserved for cases in which a positive diagnosis can be made with the microscope only.
3. The parametrium being free so far as digital examination can determine, but the case far enough advanced to be diagnosed, clinically, a high cautery amputation of the cervix, followed by radium treatment, offers the greatest hope of cure.
4. The advanced, surgically hopeless case should be treated by radium rather than with the knife, curette and cautery, chemical caustics, or Percy cauterization, unless profound toxemia or serious infection contraindicates local interference of any kind.

The replies to my letter were as follows:

"In reply to your letter of July ninth, asking my opinion as to the position you are about to take on the question of the diagnosis and treatment of cancer of the cervix, I will say that I am afraid that I cannot agree with you.

"I have nothing against the use of radium, although I have no personal experience with it. However, you must remember that comparatively few men have enough radium to carry out such treatment. Cancer of the cervix is widespread and should be seen and treated by many surgeons. The greatest good will result, in my opinion, where cases of cancer of the cervix are seen early by the surgeon and subjected to radical surgical treatment. The poor results of the radical operation came from unfamiliarity with the technic and subjecting too far advanced cases to the knife. However, many cases which can be diagnosticated as cancer of the cervix by inspection and palpation can be cured by the radical operation. This does not mean that every case should not be checked up by the microscope. But the criterion of surgical treatment for carcinoma of the cervix diagnosticated by the microscope *only* in my opinion is not broad enough.

"Have you seen Graves' last article? His work, that of Cobb, and possibly my own show what can be accomplished by the radical operation. It only remains for surgeons to strive to have the patients come to them early and to operate only upon these early cases.—*Reuben Peterson.*"

"Relative to your question as to when to apply the radical operation in cancer of the cervix, I would say that I have almost reached the point where I believe radium is the best treatment for all cases regardless of the extent of the lesion. During the last year we have operated upon very few cases; so few, indeed, as to make our statistics almost negligible. I cannot help but feel, therefore, that when we consider the remarkably good results in inoperable cases which follow radiation, the very early case ought to respond infinitely better. I do not feel, however, that I have quite reached the point yet where I am able to take the stand squarely in favor of radiation alone; but I have so nearly come to this point, I very seldom do a radical operation.—*John G. Clark.*"

"I have your letter of July 9 in regard to the use of radical (Ries, Clark, Wertheim) hysterectomy for cancer of the cervix. The Wertheim type of operation has today only a very small field of usefulness. Personally, I have not done one in three years. Radium is taking the place of the extensive operation for the cure of carcinoma of the cervix with the exception of very early cases and it is possible that it will soon be the method of choice in all cases, either alone or combined with operation. For carcinoma of the body of the uterus, total hysterectomy is the operation of choice.—*W. J. Mayo.*"

"I do not go so far as your letter would indicate in the use of radium instead of operation for carcinoma of the cervix uteri. There is no question that all of us have changed our ideas with regard to the cases that are operable, but personally I would prefer operation in a case in which carcinoma is limited to the cervix with no involvement of the vaginal walls or the bases of the broad ligaments.

"It is my custom if the growth seems limited to the cervix to first make an application of radium (100 milligrams for twenty-four hours) and then to wait for two weeks. At the end of that time I do such hysterectomy as the case seems to indicate. If the patient is in good condition and is a good operable risk I would do a radical abdominal operation. If the patient is not in good condition I would be satisfied with a less extensive hysterectomy.

"The only theoretical objections to this plan are the risk of the operation and the theoretical possibility of liberating some live cancer cells by the operation which have been encysted by the action of the radium. I consider that the risk of the operation is a very small one. Selecting only favorable cases the mortality from the radical abdominal operation is small. The risk of cancer cells which have become encysted ultimately causing trouble seems to me to be considerable. For these reasons I still consider that there is a definite group of cases that should be operated upon and that this group is more extensive than your letter would indicate. There

is another group of cases on which I operate though I appreciate that I may be wrong in doing so. I refer to the class of cases that are inoperable when first seen on account of extension to the vaginal walls or to the bases of the broad ligaments but which become operable, that is, any induration extending outside of the uterus is removed, by the application of radium. On these cases, assuming that they are favorable operable risks, I still do a hysterectomy. I have in mind one case in which the growth had extended upward into the fundus of the uterus to such an extent that it was well away from reach of radium and in my judgment beyond doubt carcinomatous tissue was removed by the operation that would not have been cured by radium alone.

"I appreciate that many of our best men have largely given up operations in these cases and are relying entirely on radium. I think only time can decide which course is the better to follow. That great benefit is derived from the use of radium is beyond question but I have not given up operation for cancer of the cervix uteri.—Howard Canning Taylor."

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TITLE INSURANCE BUILDING.

(For discussion, see p. 312.)

VALUABLE METHODS USED TO EXTEND OPERABILITY IN ADVANCED CANCER OF THE CERVIX*

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THE history of cancer is as old as that of medicine. Up to the present its cause is unknown with the mortality alarmingly on the increase, so that, today, one out of every eight individuals dies of this malady, and one wonders whether we are not facing the danger of extermination of the race by its ravages. The mortality is about equally divided between men and women, there being eleven men to every thirteen women. It is most interesting to note that, in the past twenty years, the mortality of tuberculosis has decreased 30 per cent, while that of cancer has increased 30 per cent. The death rate, in this country, shows that, in the last five years, while radium and x-rays are being actively exploited as the treatment *par excellence* for cancer, the annual increase in mortality is from 2 to 3 per cent. Such a mortality exists in New York City where x-rays and radium are, probably, used more than in any other medical center; and in this same city in the last year, the death rate of cancer far exceeds the death rate of tuberculosis. Carcinoma of the cervix constitutes about one-third of the cases of malignancy occurring in women. Statistics from the American Society for the Control of Cancer show that in the year 1918 there was, in the United States, a mortality of 11,965 from uterine cancer. Reports from the various clinics throughout this country show that in the cases of carcinoma uteri presenting for treatment, from 60 to 90 per cent were inoperable when first seen.

It is not my intention, at this time, to discuss the etiology or symptomatology of this malady. I wish only to speak of two methods which greatly extend the operability in advanced cancer of the uterus: (1) the "Starvation Ligature," (2) radiotherapy. It is not known who first employed the starvation ligature; but ligation of vessels for control of hemorrhage is mentioned in the writing of Celsus (30 B.C. to 50 A.D.), and of Galen (131-211 A.D.). The ligation of arteries is said to have been practiced at least 1800 years before Harvey discovered the circulation of the blood (1616-1619). With the discovery of the circulation and the development of knowledge concerning a part played by the blood in the nourishment of normal as well as abnormal tissue, the method of ligating arteries increased in scope. It then came to be applied not only for the control of hemorrhage, but for the

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purpose of causing atrophy of organs or other parts of the body, and to lessen the nutrition of inoperable new growths, thus checking their further development and often causing their disappearance.

The last named use of the ligature has given rise to the term starvation ligature. It has been said that Johann Muys, in 1626, recommended the starvation method by means of arterial ligature. However, the discoverer of the circulation of the blood is credited with originating this method, which procedure he used in 1651, when he is said to have treated successfully a case of elephantiasis of the scrotum and testicle by ligating the spermatic artery. It is recorded that, in 1707, Lange employed it in the treatment of goiter. A hundred years elapsed before the method was again employed when, in 1809, Travers employed it in a tumor of the orbit. Since then its field of usefulness has been gradually extended, so that the procedure has been applied to the tongue, thyroid gland, spleen, buttocks, prostate, testes, ovaries, uterus and other parts of the body. Neither in the earlier days of its use, nor in later times, has the method received the attention it merits.

During the latter part of the last century Dr. John A. Wyeth of New York, reported 789 cases of ligature of the common carotid, of which 95 were for malignant tumors of the orbit, and 91 cases of the external carotid alone were tied to relieve, or cure, so-called malignant growths. He also analyzed 18 cases of ligation of the internal carotid. He gives no statistics upon starvation ligature as applied to the internal carotid alone, and from his other cases nothing reliable can be deduced as to the practicability of this operation; though this procedure was used about the same time by many others, both in this country and in Europe, it was not until the appearance of an essay by Samuel D. Gross, "The Treatment of Certain Malignant Growths by Excision of the External Carotid," by Robt. H. M. Dawbarn, that the starvation ligature became the modified "starvation treatment," which is now an established procedure in the treatment of advanced cancer of the mouth, the face, and of the uterus. In cancer of the cervix, Fritsch was the first to use tying of the uterine arteries. In 1888, Baumgarten was the first to use it in inoperable cancer of the uterus. Howard A. Kelly, in 1893, was the first to ligate the internal iliac, which was done in an emergency on account of a violent hemorrhage that occurred during the operation. Afterwards it was used by him as a method of choice, as was also done by Pozzi and many others. Later, Bainbridge from a seven years' experience, reported in 1915, 48 cases of ligation of the internal iliac, mediosacral, and ovarian arteries, for malignant disease of the uterus. In two of his cases he ligated the common iliac with satisfactory results. In another case both common iliacs were ligated.

We will now turn from the starvation ligature to a consideration of

radiotherapy and then to the use of the two jointly. In 1792, George Adams, mathematical instrument maker to His Majesty, and optician to his Royal Highness, the Prince of Wales, reproached the medical profession for lack of tenacity of purpose in its use of electricity, at the same time, forecasting the history of electrotherapy as applied to cancer at the present time. Adams declared that electricity had considerable scope for action in surgery, in tumors, particularly of the glandular type. In glancing over the literature of the electrotherapeutic treatment of cancer, the prophetic insight of this observer is borne out one hundred and thirty years later. What applies to electrotherapy is equally true of its concomitant, radiotherapy. Radiotherapy includes radium, x-rays, and the radiant energy of heat.

The x-rays, discovered by Roentgen in 1895, were first employed in the treatment of malignant disease. The history of the use of the x-rays from then until now again verifies the prophecy of Adams. In 1913 Sir Malcolm Morris in the preface of the first treatise on radiumtherapy (Wickham) expressed an opinion parallel to that voiced by Adams in 1792, with the result that, today, the use of radium has verified this prophecy. Radium and x-ray have a selective action, producing masses of bundles and bands of scar tissue which may delay the advance of the growth; but they make late subsequent operation difficult and often ineffective. Heat prevents progress of the cancer and does not interfere so seriously with late secondary operative procedures.

Five hundred years ago Guy de Cheulic, though he used the knife in cutting out cancer at an early stage, recommended and used in growths, particularly of the fungus type, the actual cautery. The electrocautery introduced by Middeldorpf, crude as it was, was considered by many surgeons as preferable to destructive chemical agents in the treatment of uterine cancers. This method was later adopted by John Byrne, of Brooklyn, who (1892) gave his first paper in the use of the galvanocautery in cancer of the cervix. This he used in doing vaginal hysterectomy and high amputation of the cervix. The method, later improved upon by him, came to be known as the Byrne method.

In recent years, J. F. Percy developed a technic for the use of moderate heat in treatment of advanced cancer of the cervix. As he calls attention to the point that by his procedure there is in no sense a burning or cauterization of the parts, for this, according to Percy, only defeats the effort to get a maximum penetration of heat. To quote Percy: "Experimental work has shown that a low degree of heat has a much greater penetrating power in a mass of cancer than has a high degree. High degrees of heat carbonize the tissues, inhibiting penetration. Low degrees of heat coagulate the tissues, encouraging heat dissemination. High degrees of heat, with a resulting carbon-core,

prevent drainage in the cancer mass. This prevents in a certain number of cases the absorption of an excessive quantity of broken down cancer cells, which are dangerous to the life of the patient. When the temperature in the heating iron is the right degree for the greatest penetration, its shank can be wrapped with cotton and remain there for forty minutes or more. The color or texture of the cotton will not be altered in any way by this degree of temperature, and this merely emphasizes the fact that a burning temperature is not used."

W. J. Mayo calls attention to the point that, for a certain distance, cancer cells are killed and that at a greater distance they are sickened or sterilized by this method, that is, they have lost their ability to reproduce and, before the recovery of the latter is the most favorable time for the radical operation hysterectomy.

Percy states that his work is based on laboratory experiments, which show that the cancer cells cannot be successfully transplanted after an exposure of 45° C. for ten minutes, while normal tissue cells can stand a temperature of from 55° to 60° C. without being devitalized. Deyen, a number of years before Percy, experimented to determine the thermal death point of cells and came to the same conclusions. Doyen also showed that cell destruction is the result of tissue coagulation, and, that it is possible to coagulate tissues to a depth of five to eight centimeters in from one to two minutes by diathermy.

The normal cell has three periods of existence; growth, function, regeneration for purposes of growth. During the period of function, reproduction is most active. The malignant cell has no period of function; its entire reproductive activity is thrown into the first stage, and only embryonic cell growth is produced. The normal functioning cell, as a part of the community life, is protected by the entire organism of which it is a part. The nervous system, the blood supply, and the lymphatics are all a part of this mechanism. The malignant cell has no such protection, hence it is five times more vulnerable than the normal cell and is treated by nature as a foreign body. Malignancy is the property of the cell; the stroma is not a part of the neoplasia, but is a measure of nature's defense. Therefore, since the malignant cell is five times more vulnerable than the normal cell, it is not hard to see that, by cutting down the blood supply by ligature and still further lessening it by sealing the smaller vessels with heat and, also, through the heat produce increase of connective tissue which further protects against the ingress of the malignant cells, we may by this method completely destroy them, still leaving enough blood to the parts to nourish the normal cell.

Then, too, if not supplemented by the starvation ligature, radiotherapy often fails in the destruction of the malignant cells when their nests are in or near the blood vessels from which they draw sufficient nourishment to withstand its effect.

As regards the value of combining the heat with the starvation ligature method, it has been extensively tried out in this country, and though opinions vary considerably, the most reliable evidence is in its favor. The most complete report on the use of the method has been made by Smith, who records 100 cases treated at the Mayo Clinic. Of these it was possible later to perform a radical extirpation of the uterus in 26 cases; the time chosen for the hysterectomy being about four weeks after the heat treatment. In 19 of the 26 cases operated on, no carcinoma was found in the specimen removed at the final operation. Smith's results compare favorably with, if they do not surpass, the best reports from the use of radium in the same class of cases.

I wish here to supplement this report by giving briefly results obtained in a series of eight cases.

1. CASE No. 3568, housewife, age thirty-five, weight 150 pounds, multipara, metrorrhagia for two months, constant bleeding, many large clots. Tissues bleed freely upon careful examination. Cauliflower growth of cervix. Operation, August 6, 1921. Ligation of both internal iliaes and ovarians. Heat applied. Recovery uneventful. Left hospital end of third week. Cervix is normal in appearance except that the canal is larger than normal and the surrounding mucous membrane pale.

2. CASE No. 1479, housewife, age forty-six. Had 11 children; no instrumental deliveries; no previous operations; menopause two and a half years ago. Present complaint: For six weeks has been bleeding almost constantly, never profuse. Diagnosis carcinoma of cervix not confirmed by laboratory. Operation: March 30, 1921, Percy heat applied for one hour. Patient left hospital the fourth day. Has since been in good health.

3. Mrs. L. B., housewife, age forty-seven, mother of four children; normal deliveries; laceration of perineum and cervix with first. Chief complaint: Bleeding from vagina; pain in pelvis, back and legs. Physical examination negative, except cervix. Three excavating ulcers, the largest about the diameter of a dime. Bleed upon touch. Feb. 3, 1921, radical hysterectomy was attempted but patient became profoundly shocked at the time the broad ligaments had been cut from the uterus. We hurriedly withdrew from the abdomen without completing the hysterectomy. Her immediate recovery was prompt. The patient refused further operative measures, but on Feb. 19, 1921, she returned. Under anesthesia a treatment of Percy heat was given. Following this, bleeding and pelvic pain ceased. Her condition locally was improved. The patient was, the third day, up and about. She gained in weight and color and was doing her own work until one month later, contrary to her physician's advice upon her own initiative, she had radium treatment. Within 8 hours after this pain became intense, accompanied by backache and bloating of abdomen and she has never been free from pain since, refusing all other surgical and mechanical intervention. (14 hours radiation, with 50 mg. radium.) There is now an extension to bladder, rectum, and sacral lymph nodes.

4. Mrs. D. S., age forty-five years, weight 220 pounds, present illness began in 1917, chief complaint was leucorrhea and increased flow at menstrual periods. Was advised to have operation at that time, but refused, and was not seen again until October, 1919, at which time she was confined to bed too weak to stand from loss of blood. She was white as parchment. Examination negative, except vagina revealed an old laceration of perineum. The vagina was filled with blood clots. The cervix

was large and hard around the vaginal attachment. The os was crater like and the tissue broke down when examined and precipitated a fresh hemorrhage. Diagnosis: Carcinoma of the cervix, confirmed by microscopic examination. Heat and ligation of both iliaes and ovarians October 19, 1919. Results: Two weeks after operation condition changed from fungating mass as large as an orange to what resembled a normal uterus two days after a four months' miscarriage. The patient, however, being a very fleshy woman, with deep abdominal fat, and very anemic, her R. B. C. less than a million and a half, developed, evidently from her lowered resistance, a fat necrosis with infection about the abdominal incision resulting in general sepsis, and death at the end of a month.

5. Mrs. D., age forty-eight, weight 160 pounds, has had no miscarriages. Three normal births, youngest child twenty years old. Present illness: Menopause was regarded as normal until the middle of May, 1920, when bleeding became so profuse as to be alarming. Examination revealed old laceration of perineum. The cervix was hard and the os was filled with fungating material which broke down and bled freely when examined. Diagnosis: Carcinoma of cervix uteri. Pathologist's report of curetted specimen dated May 26, 1920, was, that condition was not malignant. August 28, 1920, the same pathologist was taken to her home and allowed to examine patient and take specimen for examination which he reported to be actively malignant. Operation was advised to which patient consented, but afterwards changed her mind and was not seen until March 10, 1921, at which time her condition was the same as before, only that disease was much more advanced. The cervix, at this time, filling the whole vagina and broke down when examined, bled freely. Operation: Ligation of both internal iliaes and both ovarian arteries plus heat, March 16, 1920. Results: Two weeks after cervix looked smaller and only anterior border looked unhealthy. Heat again applied April 4, 1921. Sept. 15, 1921, the uterus feels and appears like a normal senile uterus. The patient is perfectly well and is doing her own housework.

6. CASE No. 235, Mrs. M. S., age forty-two, weight 155 pounds. Mother died of cancer of uterus; father died of cancer of liver. Personal history: Had abdominal operation, February, 1913, when left ovary and both tubes were removed, and a Gillian suspension done. Since then she has been well. Present complaint: Backache, slight bloody vaginal discharge and irregular menstrual periods. Friday, Feb. 4, 1921, on account of a chill, physician was called. A slight pinkish discharge has been present for some days. Also has abdominal pain and backache with sensation of fullness in bladder. Vaginal examination revealed a large very nodular mass filling upper portion of vagina with an area of induration extending toward the anterior vaginal wall, with a uterus that was somewhat, but not freely, movable. Diagnosis: Advanced carcinoma of the cervix uteri. Laboratory report, medullary mixed cell, basal and squamous, carcinoma of the cervix uteri. Operation: Feb. 9, 1921, Percy heat was used coupled with ligation of both internal iliaes plus crushing and ligation of upper portion of each broad ligament. The adhesions resulting from the previous operation were so extensive that a hysterectomy would be mechanically impossible. This patient made a nice recovery, leaving the hospital four weeks later. Since then she has had a series of x-ray treatments attacking the pelvis anteriorly, posteriorly, and laterally. From each of these treatments she always had a marked radiation sickness lasting for days. She has had one radium treatment which also was followed by a severe sickness for several days. No such reaction followed the use of the heat treatment. This woman was examined in my office within the past week. She says that she is well except that she has not fully regained her strength. She looks well; the cervix is normal, except that the contour is changed as is also the upper portion of the vagina.

7. CASE No. 632C. House wife, age twenty-eight, weight 165 pounds, nullipara, denies ever being pregnant, has never been ill. Cause for consultation: First noticed bleeding five years ago. It is accompanied by pain. At first noticed a spot of blood on clothing, occasionally, three or four times a month. Some discharge before her periods; this has gradually been getting worse. About a month ago she took a great deal of exercise, walking, climbing hills, and bathing daily. This seemed to make her bleeding worse. Has worn napkins daily for the past month. For the last two months she has had a yellowish discharge mixed with the blood, and of foul odor; probably pus. Vaginal examination reveals a fungus mass bleeding readily. Diagnosis: Advanced carcinoma of uterine cervix. Diagnosis by pathologist, from curettings: Medullary, basal celled type of carcinoma of the cervix uteri, actively growing. Consultation: Diagnosis concurred in and advice of consultant to abstain from operation as case is hopeless. Operation, August 16, 1920. Percy heat, coupled with ligation of both iliaes and both ovaries. Patient left hospital during third week after an uneventful recovery. Though no bleeding ever occurred after this operation, there was a small area about the cervical canal which was slow in clearing up. One radium treatment promptly disposed of this. I saw her in my office one week ago today. She is perfectly well. Now weighs 190 pounds, having gained 25 pounds since the operation. The cervix is healthy and she menstruates normally and regularly three days in each month.

8. CASE No. 305. Housewife, age thirty-eight, has five children, last baby eight months old. Present illness: For over a year patient had noticed a slight bleeding between periods. Flowed twice while carrying last child. This occurred about the fifth or sixth month. Flow regular since birth of last child, except that during the last three weeks some clots passed. No pain or other disturbance associated with the bleeding. Patient otherwise well. Vaginal examination reveals a large round, hard, bleeding mass growing from the cervix and extending well out into the anterior and posterior vaginal walls. Vaginal examination, under anesthesia, showed further that the rectum is infiltrated with the growth, as is also the perimetrium. Infiltration is so extensive that the whole is as if it were set in masonry. Diagnosis: Advanced carcinoma of the cervix uteri. Prognosis: Case deemed hopeless. Pathologist's report, Jan. 22, 1920; early active, rapidly growing, medullary, squamous celled carcinoma of the cervix uteri. Since no other form of treatment seemed to offer any hope whatever, we decided to resort to the heat and ligature method. Operation, Feb. 18, 1920. Bilateral salpingo-oophorectomy, ligation of both internal iliaes, Percy heat. Just below the bifurcation of the iliaes was an enlarged and broken down lymphatic gland which was removed. Pathologist's microscopic diagnosis: Passive congestion and early atrophy of the fallopian tubes, cystic degeneration of the ovaries, and far advanced rapidly growing carcinoma in the extrinsic tissues. Recovery from operation was rapid and without incident. May 3rd, ten weeks later, examination shows that the indurated area is much lessened. The uterus is freely movable, general condition of patient good. No hemorrhage in six weeks. June 7, heat applied for forty minutes without anesthesia. Aug. 3, examination in the office shows no induration about the vagina or cervix, that the contour of the cervix is good. The tissues are smooth and gliding, the uterus small, the fundus forward and in a good position. The parts are normal in color except some slight thin scarring of tissue in the vault of the vagina. The woman looks well, has a ruddy complexion, has gained in weight, and states that she feels as well as when she was sixteen. Clinically, she is apparently cured. August 24, three weeks later, the condition is the same; at this time, by sharp dissection, a portion of the cervix was removed for microscopic study. This was followed, immediately, by another application of the Percy heat which was used

for two hours. Pathologist's report: From this tissue which seemed to be normal, microscopic examination shows that there are still some growing cancer cells. Two weeks later it was deemed opportune to do the radical operation, which was done Sept. 11. Preceding the operation, cystoscopy was done and the bladder was found normal in appearance. In the abdomen we encountered broad extensive adhesions, binding the bladder and sigmoid to the uterus, these were freed with much difficulty. The uterus was small, the walls of the blood vessels appeared much thickened and the lumen materially narrowed. It was noticeable that the uterus and broad ligaments were quite anemic. There was one lymphatic gland the size of a small almond taken from the left side near the cervix and between the folds of the broad ligament. A hysterectomy was done, going well out into the broad ligaments, including the upper portion of the vagina, using for dissection the cautery knife. Pathologist's report: Microscopic examination (partial). The specimen is labeled—uterus. Most of the areas appear to be distinctly contracting. This is less noticeable, however, in the smaller cell nests. All of the neoplastic tissue presents the general cell picture of degeneration in addition to being quite markedly swollen and blurred. The neoplastic tissue appears to have undergone more degenerative change than the supporting tissue. Histologically, there remains an open question as to whether all other cancer cells are devitalized. Diagnosis: Caloric and atrophic change in carcinomatous and uterine tissue following ligation of blood vessels and repeated cautery treatments. Later this patient was given a series of x-ray treatments. Each treatment was followed by a radiation sickness; other than this she has remained well. I received a letter from her husband within the last few days expressing to me their gratitude.

Of the eight patients every one has shown improvement locally. One died of sepsis. One in which ligation was not done, but heat used after uncompleted operation, improved locally and in her general condition, until later, when radium was employed. This was immediately followed by extension of the growth. One, the last, operated, has cleared up locally and is improved generally. Seven of the patients (87.5 per cent) are living, two (25 per cent) are improved, five (62½ per cent) are clinically cured. If no permanent cure has been effected, the relief from symptoms and prolongation of life, has made this work worth while. The purposes of this method are:—

- (1) To control hemorrhage which is sufficient to cause a constant drain on the patient's vitality or is so severe or frequent as to warrant fear of a fatal return at any time.
- (2) To facilitate the discharge of pus and necrotic tissue, also diminish the absorption of poisonous products.
- (3) To control the progress of the disease thereby lessening pain and suffering.
- (4) To render a later total extirpation possible.
- (5) That suffering may be lessened and life prolonged in many cases when all other methods have failed.
- (6) That in many apparently hopeless cases life may be saved and a clinical cure effected.

Having observed these eight cases with as much precision as I am capable, coupled with a perusal of recent literature on the subject, I am prompted to offer the following as points that should be emphasized.

- (1) The use of the starvation ligature mechanically accomplishes

instantly in the blood supply what a study of a microscopic specimen of carcinoma shows nature is endeavoring to accomplish. (2) The vessels should be tied at two points with either kangaroo tendon or heavy catgut ligature, as finer catgut may cut the vessel wall and precipitate a hemorrhage. Between the ties the arteries are crushed to a ribbon. Absorbable suture is used to avoid, as far as possible, the irritation factor that will, undoubtedly, arise from the use of the nonabsorbable material. (3) In applying the heat the temperature is kept at 122°-140°F. and the abdomen should always be opened so that the heating iron can be properly guided from the vagina through the cervix to the fundus. By so doing, not only is the iron properly adjusted, but the gloved hand of an assistant placed over the fundus is an aid in determining the amount of heat to be used, and the danger of injury to the bladder, rectum and ureter, with the formation of fistula, may be avoided and sealing of the smaller blood vessels and lymphatics accomplished. (4) Should one not care to depend upon the heat and starvation ligature, and extirpation of the uterus is to follow, it should be done as a thermocauterectomy between the second and fourth week before the sickened cells have recuperated, and before the deposit of scar tissue is sufficient to interfere seriously with operative procedures. (5) With no other method can the fixed pelvic structures be loosened and mobilized as by the heat and ligature. (6) Adequate x-ray and radium treatments cause a decided radiation sickness from which the patient does not fully recover for from one to six weeks, rendering a hysterectomy hazardous. Hence, in this respect the heat has advantage over the x-ray or radium. (7) (a) After surgical procedures have been completed, x-ray or radium, or both, may be employed to advantage as was done in three of my cases; (b) if hysterectomy is not to be done and the growth is well within the cervix, radium alone is indicated; (c) if involvement is broad x-ray, combined with radium, is used; (d) if hysterectomy had been done, then later x-ray is used if doubt exists as to whether all cancer bearing tissues have been removed or if there is a recurrence. (8) (a) Post-operatively to pursue a set course, without variations, is hazardous. As far as postoperative cure is concerned, we should individualize the carcinoma of the cervix. (b) Along with the details above mentioned, attention should be given to diet, fresh air, and other measures that will raise the general resistance of the individual. (c) Inattention to details will lead, as it too often does, to failure of cure and bring unjust criticism upon the method. (9) In advanced carcinoma of the cervix, heat and starvation ligature are methods that should precede a contemplated panhysterectomy. While x-rays and radium are useful postoperative adjuvants, they should never be used as pre-operative measures.

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(For discussion, see p. 312.)

THE CONTROL OF THE MORTALITY OF ABDOMINAL OPERATIONS FOR CANCER*

BY GEORGE W. CRILE, M.D., F.A.C.S, CLEVELAND, O.

ON THIS occasion I wish to report the methods and management of operations upon that group of patients who constitute a large portion of the group of handicapped cases whose successful treatment taxes to the utmost the resources of the surgeon, namely, abdominal operations for cancer.

The two outstanding principles which we shall describe were developed as the result of experience in the war. These two principles may be briefly formulated as follows: I. Protection of the patient in advance of the emergency. II. Control of infection (a) by the separation of contaminated surfaces from each other; and (b) by prevention of the pooling of wound secretion.

I. Protection of the Patient in Advance of the Emergency.—To achieve this end all the restorative measures that would be employed after it is recognized that the patient's life is threatened are employed *in advance of the probability* of the advent of danger. That is, when an operation, the mortality of which according to general statistical reports is from 10 to 25 per cent, is to be performed upon a patient, the patient is given the benefit of all the restorative and protective measures *before the positive indication* for their use has developed. In other words, we utilize the principle of prevention in surgery, as the principle of prevention is employed in medicine.

We shall never know in how many of the cases in which we have applied preventive measures those measures would have been required; just as no one can say how many of the individuals inoculated against smallpox or typhoid would have developed either of those diseases without that protection. In either case the value of the preventive measure

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must be judged by the effect upon the gross mortality as established by mass statistics.

Thus, as we might say, we do not treat the patient but the probability. One may, at first, feel that a disadvantage to this plan appears in the fact that if all our protective and restorative measures are employed in advance of the emergency, there will be nothing left to be done for the patient should he "go bad." The answer is, that the emergency will rarely develop; and, as shown by our experience at least, the mortality rate of operations upon bad risk cases will be markedly reduced.

The specific application of this principle in bad risk cases requiring resection of the stomach or resection of the intestine consists in (a) *the establishment of water equilibrium*; (b) *maintenance of a failing circulation*; (c) *psychic and physical rest*; (d) *completely anociated operation*; (e) *the application of heat*.

(a) *The establishment of water equilibrium* is secured before and after operation by subcutaneous infusions of novocaine $\frac{1}{32}$ per cent in normal saline (Bartlett). (b) If the *circulation* is feeble and in the presence of *anemia* a transfusion of blood is made before operation. This is repeated before, during, or after operation according to the requirements in the individual case. (c) *Psychic and physical rest* are promoted to the utmost degree possible before and after operation; morphine being given if it is required to assure the maintenance of the state of negativity. (d) *The performance of an anociated operation* means that in these cases the utmost precaution must be exercised to avoid further impairment of the internal respiration. Lipoid solvent anesthetics and complete surgical anesthesia therefore are contraindicated. The operation is performed under nitrous oxid analgesia and local anesthesia. (e) The internal respiration is promoted by heat and is markedly impaired by chilling of the viscera. During the operation therefore the exposure of the viscera is reduced to the minimum and, after the operation, heat is applied to the whole abdomen in the form of moist hot packs.

II. *The Control of Infection*.—It was long ago recognized in civilian practice, but was dramatically demonstrated during the war, that contamination may be prevented from going on to infection by preventing the contact of one raw contaminated surface with another raw contaminated surface, and by preventing the pooling of wound secretion. The control of infection is further promoted by the protective and restorative measures already described; for the greater the resources of the patient, the better the local defense.

The application of these principles in resection of the large intestine is accomplished as follows: The operation is divided into two stages. In the first stage by means of a colostomy or by visceral anastomosis,

the fecal stream is diverted from the field of resection, so that there will be no danger of fecal leakage at the point of resection anastomosis. There is no doubt that in many cases it may be safe to perform the entire operation at one seance; but, on the other hand, if too great a chance is taken in an operation, it may be regretted, but the opportunity to save the patient cannot be returned.

After the preliminary operation every effort is made to increase the resistance of the patient. In attaining this end, the application of the general principles of restoration and the length of the interval before the resection is performed are varied according to the needs of the individual case. Generally, however, about a week elapses after the preliminary operation at which the operability of the case has been ascertained and the fecal stream diverted from the field of resection. At the end of this period the patient is a much safer risk.

At the end of the resection, the technic of which is now so well standardized, a single layer, or at most two layers, of iodoform gauze are interposed between the contaminated raw surface areas. This is removed in from four to six days and the wound dealt with either by a similar redressing or by the intermittent use of Dakin's solution.

The restorative measures already described are used. If restoration lags, blood transfusion is given and even repeated several times. The dietetic and hygienic regimen employed in the treatment of tuberculosis aids the convalescence.

The protective value of these measures is strikingly illustrated by the fact that in my last 66 operations for cancer of the rectum and large intestines there has been but one death; while the mortality rate in operations on the stomach and the intestines has fallen to 2.6 per cent, the operability has been extended until no case is refused for operation unless anatomically inoperable; and the postoperative morbidity has been progressively diminished.

CLEVELAND CLINIC.

(For discussion, see p. 312.)

THE NEW TREND IN GYNECOLOGICAL THERAPY*

BY GEORGE GELLHORN, M.D., F.A.C.S., ST. LOUIS, MO.

IT was the name of this organization that decided my choice of a subject. The very name suggests that close relationship of the sister sciences of gynecology and obstetrics from which, practically, all the progress of the last decades has sprung. This intimate kinship, this physiologic union of the two branches of medicine has repeatedly been assailed of late years and in several seats of learning it has actually been disrupted. In some of these instances, the sincere though mistaken idea may have prevailed that gynecology was nothing but a surgical specialty, while in others, personal and, therefore, all the more regrettable, motives seem to have been at work.

Be that as it may, it is a curious irony of fate that just at the moment when the general surgeons claim the gynecologic field as their own, gynecology has entered into a new phase of development where efforts are being made to replace surgical methods of treatment largely by nonsurgical means. It will be an easy and, I hope, an interesting matter to substantiate this statement by a brief survey of the situation.

Let us begin with cancer of the cervix—a surgical disease in the truest sense of the word. I will not again go over the ground that has been so well covered in today's discussions, nor will I present the statistics prepared for my own paper. These have been published elsewhere.¹ In a deadly disease like cancer every single case which is permanently cured is a decided gain and a triumph of our surgical endeavors; thus the operative cures of approximately 25 per cent might well be a source of satisfaction to us. But when we contrast this figure with the number of all patients afflicted with cancer, our achievements dwindle in importance.

For practical purposes the proposition amounts to this: Of 400 women who seek our aid for the relief of cancer of the cervix, barely 100 are actually and radically operated upon.² The other 300 are hopeless cases; their doom is sealed even though we may inflict some sort of superfluous surgery upon them. Of the 100, on whom the radical abdominal operation is performed, about one-fourth die of the operation, about one-half die from recurrences, and about one-fourth are alive and well after five years. A material change in this sum total is hardly to be expected because the technic of the operation seems to have reached the zenith of perfection.

And now comes radiotherapy as an earnest competitor of the

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surgical treatment in cervical cancer. To be sure, radiotherapy is still on probation. The first five-year period of observation has passed only recently and the percentage of radium cures is still a point or two below that of the surgical cures. But if we look upon these statistics in their true light, they will assume a new significance. The radium results reflect, to a large extent, the infancy of the new method which is just about to emerge from the crude empiricism of its initial stages. Better results, therefore, are bound to come in the future. Even now, one authority³ at least has already obtained results with radium that are in every way identical with those derived from surgery. Then, too, the cases treated with radium are on the whole more unfavorable than those subjected to operation. And to offset the slight difference in final results, there is a primary mortality from radium of 3 per cent as compared with the 20 or 25 per cent after operation.

If men of vast experience and superior technical skill, like Doederlein and Bumm,⁴ eliminate surgery altogether in the treatment of uterine cancer and rely exclusively on radiotherapy, we should pause to think. As long as the subject is still a matter of discussion, the advocates of operation are, of course, justified in adhering to surgery; but the fact stands out in clear relief that surgery is no longer the only mode of attack and, unless all signs fail, the future of the treatment of uterine cancer belongs to radiotherapy,—at least until a biological method of treatment will have been discovered.

Personally, I had arrived at a formula which, until recently, seemed highly satisfactory to me.¹ Inoperable and borderline cases were treated exclusively by a combination of radium and x-rays. Early cases were operated upon by the radical abdominal method and received a preoperative treatment with radium and a postoperative treatment with x-rays. But I confess that my former confidence has deserted me, and at present my efforts are confined strictly to radiotherapy.

Another field of gynecology in which the therapy has, until recently, been exclusively surgical, is that of fibroids. As we look back upon the brilliant development of the operations for fibroids and consider the steadily decreasing mortality and the benefits reaped by our patients, we can well understand that the feeling became established in the profession that the question of the best treatment was definitely and satisfactorily settled.

The first reports on the effect of x-rays upon fibroids came as a complete surprise and met, in many quarters, with considerable incredulity; but extensive confirmation came in a very short time, and today it may be accepted as a fact that x-rays and radium check the hemorrhages in about 98 per cent and reduce the size of the tumors in from 70 to 80 per cent of the cases. Further improvement may be expected

from a more careful selection of the cases, the use of more powerful x-ray apparatus, and, perhaps, also from a judicious combination of radium and x-rays. At any rate, the surgical method of treatment, hitherto supreme, has now found a very strong rival in radiotherapy which can point to a mortality of 0 as against an average mortality of 3 to 5 per cent or even more, after surgical procedures.

Radiotherapy, however, cannot supplant surgery altogether. There are still enough cases of fibroids left in which an operation alone is indicated; but it is a significant fact that it is just the case with a poor surgical risk, the exsanguinated or the very fat woman, the patient with kidney or heart complications, that is particularly suited to, and benefited by, the new treatment. This is not the place to go into details as to indications and contraindications or a comparison of the complications following the two methods. The reader is referred to two previous publications.^{5, 6} Suffice it to say that, approximately, only 30 per cent of the cases need operation while the overwhelming majority can be cured by nonsurgical means. Doederlein applied x-rays in 222 cases of fibroids and used the knife in 91 others in the same period of time. Kelly used radium in 210 cases and operated on 45.

The treatment of chronic inflammations in the pelvis, particularly those of gonorrheal origin, forms one of the most changing and interesting chapters of gynecologic therapy. We have all witnessed and participated in these changes. It did not take long to realize that the so-called conservative treatment, that is, rest in bed, douches, tampons, and the like, only served to hasten the transition from the subacute to the chronic stage, and that an operation was required to bring about a cure. The surgical treatment itself underwent a long and varied evolution within the memory of most of us. At first satisfied with removing only the affected tube, we soon learned that the apparently healthy tube of the other side quite regularly developed into a pyosalpinx and demanded a second operation. Then, the persistence of the inflammation in the interstitial portions of the tubes required deep excisions of the uterine horns. And yet, the patients continued to complain of symptoms that arose from the uterus and did not cease until that organ was eliminated. To reduce this dreary train of operations, Beuttner, of Switzerland, devised an operation which was sponsored by Polak, in this country, and revived by Bell, in England, and consisted of the removal of both adnexa and a part of the uterus. Other operators believed that an ascending gonorrhea in the female was, in a way, an incurable disease and, following the lead of Schauta and Landau, extirpated the entire uterus with both adnexa. Whatever method was adopted, it ultimately mutilated and unsexed the patient; and, as the disease occurs only in the reproductive age and is found more often in persons young in years, even the most successful outcome of our opera-

tions could not possibly fill us with wholehearted satisfaction. It was just this state of mind that induced many of us to attempt more conserving operations, such as injecting the tubes with some antiseptic fluid, splitting and draining them, etc., but you all know that these measures ended in signal failures.

More recently, however, a determined effort is being made to attack gonorrhea of the internal genitals by nonoperative means. Two novel methods have thus far been proposed. The first of these originated with Van de Velde,⁷ of Holland, who started from the familiar observation that the approaching menstruation exerts an untoward influence upon an acute salpingo-oophoritis. The inflammatory process, which above all else requires rest and protection, is stirred up by the cyclic changes in the ovaries and the resulting phenomena in the pelvic organs. In these cases, Van de Velde applied radium and x-rays alone or combined and claims to have produced a "temporary" castration. The ovarian function was suppressed for from several months to one and one-half years; there was no exacerbation of the inflammation but fever and other symptoms subsided, and complete cure could be brought about by a simple absorbent therapy. Similarly good results were obtained in cases of chronic recurrent adnexal inflammation.

The second method is the adoption of foreign protein therapy in gynecology of which the vaccine therapy was an early though inefficient forerunner. By the introduction of foreign proteins, the protoplasm of the cells is stimulated to greater activity and the afflicted organs are, thereby, enabled to restore themselves to normal conditions. This, at least, is the theoretical explanation of the astounding results observed after the intramuscular or intravenous injections of milk or casein. A very recent article by Zill⁸ includes a report of 90 cases of large adnexal tumors treated in this manner for several weeks. Of these 90 cases, 59 were cured completely, that is, the palpatory findings were perfectly normal; 27 were improved, in that there was still a slight thickening of the adnexa, but the subjective well being of the patients was unimpaired; and only in four instances there was no improvement.

A very similar rationale underlies the treatment of ascending gonorrhea by means of injections of turpentine. This substance deposited in the subfascial tissues, produces a reaction which sets free homologous proteins, and these, in turn, are apt to activate the protoplasm of the cells of the inflamed structures. A diminution, and even disappearance, of the adnexal tumors has been claimed in a large percentage of the cases thus treated.^{9, 10} It is not surprising that a number of authors¹¹ have failed to observe such satisfactory results, for all these efforts of treating an ascending gonorrhea are still in an experimental stage; but they are highly promising and indicative of the present non-operative trend in gynecologic therapy. Their final success would

confer a blessing upon our patients whom we can *cure* by operation only at the expense of their genital function.

The abuse of the curette has been a much discussed evil, and the attempts at restricting this favorite instrument to its legitimate use in abortion, polyps, and, for diagnostic purposes, in cancer, have been numerous. We have now advanced far enough into a better appreciation of the pathologic physiology of the female genital organs to know that dysmenorrhea and sterility very rarely require curettage. The profuse hemorrhages of adolescence, once the indication for repeated curettages, are now explained by endocrine disturbances and treated accordingly. As we learn to recognize a syphilitic metrorrhagia, we shall have no need for surgical treatment in cases of this kind. Uterine discharges of any kind used to call, automatically as it were, for the curette while today this instrument would be the very last thing an up-to-date gynecologist would consider in the treatment of this most common of all symptoms.

Another illustration. About a year ago I demonstrated before the St. Louis Medical Society the amazing effect of radium upon condylomata acuminata, and since then two papers have appeared reporting the same results with x-rays.¹² All along the line then, we see, today, a tendency to replace surgical means by nonoperative means in the treatment of gynecologic affections.

But the factor that promises to do more than any other towards reducing the need for surgical intervention, is the product, the very child of that much maligned and wantonly disturbed union of obstetrics and gynecology—*preventive obstetrics*. It mattered little to the midwife of whatever sex, whether or not the cervix was torn in delivery as long as the bleeding was not excessive. It was the gynecologist with obstetric training and obstetric practice who realized the relations of cervical lacerations to subinvolution and its sequels, and their possible bearing upon cancer, and who insisted upon the necessary care in applying forceps. Neither did the midwife pay much attention to the position of the uterus four or six weeks after confinement; and again, it was the gynecologist who recognized that more than 75 per cent of all displacements occur after labor, and that these may be prevented by the proper hygiene of the puerperium or cured by the temporary use of pessaries.

I trust that nothing that has been said in these pages, will be misinterpreted as a disparagement of surgery, its brilliant progress, or its marvelous results. Any such thought would ill befit one who himself is a gynecologic surgeon. But I take it that our ultimate object is the *cure* of the patient, not the *specific method* by which we arrive at our goal, and it seems to me that, as far as our present attitude goes, this ultimate object is attainable in a large percentage of the cases by non-operative means.

It is, therefore, not illogical to suggest, at this time, a revision of our previous therapeutic conceptions and to point to the necessity of a recasting of our fundamentals of treatment. It may, then, be seen that gynecology is, after all, not an exclusively surgical specialty, that with all the tremendous importance and value of surgical treatment, it is neither the only nor even the most important means at our disposal.

When a business house takes over another business concern, an inventory is made prior to the transfer. You may say that such stock should have been taken *before* gynecology was bound over to surgery. Precisely; but since the transaction seems to have taken place without such a procedure, it might be well to provide an inventory *post festum*, so as to have it on hand in the future if a readjustment should be under discussion. It may be that gynecology will revert from the security of present nonoperative gains to former surgical methods; but this is highly improbable because the present status of affairs indicates, to my mind, a *higher* phase of development. It may also be that gynecology in its present form and with a growing leaning towards non-operative lines, will not appear as attractive to surgery as it has seemed in the past, so that the realignment of gynecology and obstetrics will meet with less opposition.

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METROPOLITAN BUILDING.

(For discussion, see p. 316.)

THE HYPERTROPHIC-ULCERATIVE FORM OF CHRONIC VULVITIS. (ELEPHANTIASIS, ESTHIOMENE, SYPHILOMA)*

By FRED. J. TAUSSIG, M.D., F.A.C.S., ST. LOUIS, MO.

A FREQUENT source of confusion in medical literature lies in the attempt to call by one name conditions that are really manifold in their etiology and clinical appearance. A good illustration of this is to be found in the peculiar chronic infectious enlargement of the vulva to which the terms elephantiasis, pseudoelephantiasis, esthiomene, rodent ulcer, lupus, granuloma, and syphiloma of the vulva, have been applied. Perhaps the term that is most nearly justified is that suggested by Stein, "syphiloma," for syphilis is doubtless the most frequent etiologic factor in the formation of these hypertrophic ulcerating growths. Granuloma fails to express the hypertrophic character of many of these cases. Lupus is identified with tuberculosis, which is only rarely present. Esthiomene and *rodent ulcer* would apply more to the ulcerating cases and elephantiasis, though most generally adopted, has the least to recommend it, because of the confusion with filarial lymph stasis and the absence of any consideration of the chronic infectious character of the condition.

I would prefer to get along, as far as possible, without any hard and fast term but rather to group this condition as the *hypertrophic ulcerative form of chronic vulvitis*. Under this general head, the cases due to syphilis, to tuberculosis, to the "*climato bacterium granulomatis*," to filariasis, and to other sources of infection can be separately considered. Any attempt, however, to individualize these cases will meet with difficulties, for symptomatically, anatomically and even histologically, they are often so much alike that their etiology cannot be determined.

As I see it, we should not be concerned so much with the particular microorganism, that may be present in any one case, as with the special anatomic, physiologic, racial, and social factors that lead to the production of this characteristic lesion. Beside the infecting agent or agents there are, I believe, five factors that can be held responsible: (1) A racial predisposition to fibrous hypertrophy. (2) The manner of lymphatic distribution in the vulva. (3) The looseness of the vulvar skin predisposing to edema. (4) Lack of cleanliness from secretions and excretions in this region. (5) Repeated excoriations from coitus with resulting chronic wound infection.

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(1) When we consider that the negro makes up but one-tenth of the population of this country, it is striking that, practically, all these cases of vulvar hypertrophy in American literature are found among colored women. Stein's two cases, Gallagher's four cases and the 13 cases considered in the present report were all negresses. In fact I can recall having seen but one such case in a white woman, a prostitute, in whom, moreover, an admixture of negro blood was suspected. Even the filarial form of elephantiasis of the vulva has been noted primarily in the colored races. In European literature the condition has been found almost exclusively among prostitutes. That this tendency to fibrous hypertrophies of the vulva among colored women has some relationship to the similar tendency to keloids and uterine fibroids in

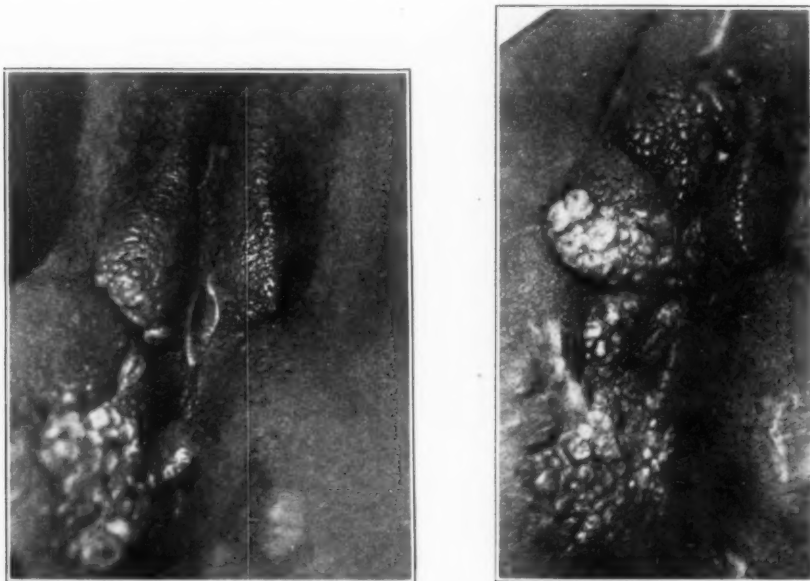


Fig. 1.—(Case 11) Combination of ulcerative and nodular form of chronic hypertrophic vulvitis. On the left side we see beginning hypertrophy with extensive ulceration. The right hand picture was taken $2\frac{1}{2}$ years later and shows the continued ulceration with marked hypertrophy of clitoris and right labia.

this race, seems more probable. There can be no question as to the pronounced racial predisposition to this condition existing among the negroes. I have seen neglected syphilitic ulcerations in white women, even prostitutes, produce only slight thickening or edema of the labia, while in the negress there usually developed a considerable pendulous tumor.

(2) The anatomic distribution of the lymph channels of the vulva predispose to lymph stasis. In filarial infections, the occurrence of a lymphatic enlargement in the inguinal and femoral region not only blocks the flow to the leg, but also to the labia on the same side, Koch has reported cases following removal of the inguinal glands.

The two most pronounced hypertrophies in my series occurred in women who had had a chronic infection of the inguinal and femoral lymph glands preceding the development of the mass in the inguinolabial fold on the same side. Lymph stasis of some degree, whether in the groin or in the vulvar tissue itself, must be considered as a *sine qua non* in the production of these enlargements.

(3) The looseness of the vulvar skin makes possible the formation of chronic edematous deposits with resulting fibrosis and enlargement of these parts. Together with the eyelids and the back of the hands, the vulva is one of the first points at which a tendency to edema will be manifested. The edema of pregnancy is often localized in the vulva.

(4) Uncleanliness is an important etiologic factor. In no instance is this disease found among women of the better classes. Persons with neglected syphilis and gross lesions about the external genitals may develop a slight thickening of the tissues; but, if they are clean about



Fig. 2.—(Case 13) The nodular type involving clitoris and left labium minus in a patient who had been confined two days previously. The tumor hung between the thighs and was very edematous. No ulceration whatsoever in this case.

their person, they do not develop these extreme hypertrophic ulcerations. Often a syphilitic rectovaginal fistula, together with a gonorrhea, makes it almost impossible to keep the parts clean. On the other hand, once the condition has developed, the best care and hospital nursing trying to keep the parts clean, will not materially influence the size of the mass or the extent of the ulcerations.

(5) The disease is found solely during the period of greatest sexual activity, and it is certain that the repeated traumatisms of coitus, especially in prostitutes, has much to do with the production of hypertrophy. The frequent occurrence of tertiary syphilitic ulceration about the vestibular ring results in repeated injuries with resulting wound

infection following coitus. The poor nutrition of these parts produced by the lymph stasis and obliterating endarteritis make wound healing slow; so that, in most instances, these ulcers do not heal entirely and must be excised.

As to the nature of the infecting agent in this disease there is, as has already been stated, much difference of opinion. Syphilis is found in 80 to 90 per cent of the patients; but there is some difference of opinion as to whether the lesion is to be classified as a tertiary gummatous deposit or as a postsyphilitic process. Many of these cases have a negative Wassermann with positive evidence of a previous syphilis. One or two of my cases, that have been under observation a long time, had a positive Wassermann in the first year of ulceration and then, later, when the hypertrophy became more pronounced, developed a negative Wassermann. Even after therapeutic excitation, the test remained negative. Such cases were, usually, totally uninfluenced by treatment; so that I feel we cannot properly class them as syphilitic lesions, but rather as chronic ulcerations on the basis of syphilitic scar tissue.

While textbooks on gynecology have, in the past emphasized filariasis as a factor, it is apparently rather rare, not nearly as frequent as the filarial elephantiasis of the scrotum in men and limited to certain tropical areas. In only a small portion of those in whom the diagnosis of filarial elephantiasis vulvae is made are the filaria actually found circulating in the blood. Some believe it to be purely a post-filarial condition.

Dermatologists have made special studies of a form of vulvar hypertrophy found in Porto Rico, British Guiana, and tropical regions, in which the development of ulcers is more pronounced than in filarial infections. They have found a peculiar germ called the "*climato-bacterium granulomatis*" in all of these lesions. Most authors feel certain that this disease is not syphilis. The slow advance, superficial character, and the vascularity of the lesions, tend to differentiate it from gumma. Goodman's recent reports in the Archives of Dermatology emphasize the contagious character of these lesions and its occurrence, primarily, in prostitutes.

Tuberculosis of the vulva has been found in some few cases associated with these hypertrophic tumors and, in one of my series, the absence of any syphilis, the presence of giant cells in the ulceration, and the positive signs of an active tubercular lesion in the chest, make the suspicion of a tubercular factor in the production of the lesion very strong.

Gonorrhea is, probably, never a primary factor, but will often greatly increase vulvar irritation and so, secondarily, aids in the growth of the vulvar enlargements. In the presence of a profuse

leucorrhea the tendency to the papillonodular form of hypertrophy is more pronounced.

In two instances of my series tissue was removed and specially stained for Ducrey's chaneroid bacillus, but with negative results. A suppurating bubo will, however, predispose to lymph blocking and so, in the presence of syphilis, may lead to more pronounced enlargements.

In general we may distinguish three types of cases according to location: (1) An inguinal-labial type involving, usually, only one side, and leaving the clitoris unaffected. (2) A clitoral type involving



Fig. 3.—(Case 6) Microscopic section of nodular mass removed by operation. Everywhere are areas of lymphocytic infiltration. The epithelium shows increased keratin but less papillary extensions with the connective tissue than ordinarily is formed. No superficial ulcers present at time of operation.

the clitoris and, usually, also both labia minora; but not the labia majora. (3) A diffuse type in which the hypertrophy is more general, involving the entire vulva more or less.

A further grouping of these cases is also possible according to the prevailing type of pathologic lesion. We can have: (1) A *hypertrophic* form, in which large pendulous tumors are found, usually with but slight ulcerations. (2) An *ulcerative* form, in which the ulcerating granuloma makes up the bulk of the enlargement. (3) A *papillary*

form, in which the tumor surface is covered with small nodular or papillary excrescences. Often there is a combination of two or more of these forms.

Symptoms are usually insignificant in this disease. This may, in part, be due to the low state of intelligence and lowered pain sense in these individuals. Some discomfort from the weight of the pendulous mass, interference with walking, and urinary and rectal irritability may be noted. If the mass becomes more acutely inflamed, for some cause or other, there may be pain. Dyspareunia is often the

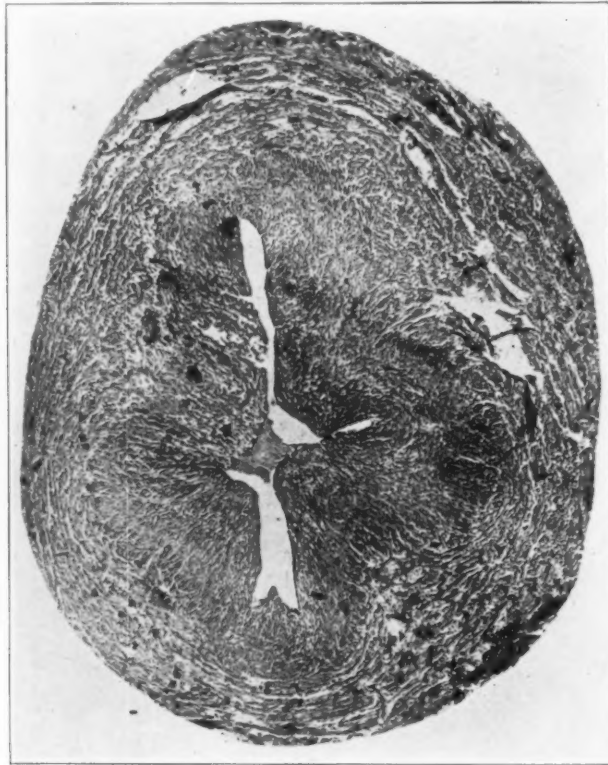


Fig. 4.—(Case 6). Cross section of blood vessel formed in tumor mass showing obliterative endarteritis.

main reason for their seeking medical advice. When we think of the severe pain some women experience from small burns or chancreoid sores about the vestibulum, it is amazing that these extensive ulcerations produce so little discomfort. Very meagre, and often contradictory statements as to the duration and course of the disease, are given by these dull-witted individuals.

From a diagnostic standpoint this condition is of interest because of its confusion with carcinoma. In the latter, however, we have a circumscribed lesion that is brittle, bleeds easily, and is practically

never found in the negress before the menopause. The differentiation from fibroid tumors of the vulva is usually easy, since fibroids are circumscribed, have a smooth skin surface, and present no evidence of ulceration.

A word must be added regarding the treatment of these cases. Antisymphilitic treatment, even the most persistent and vigorous, will not cure these cases and will only rarely and temporarily affect the size of the tumor mass. It is well, however, that such treatment be employed to promote prompt healing after surgical intervention. The record in the seven cases that underwent operation in my series, shows the uniformly satisfactory results of vulvectomy in these cases, provided only, that the incision be wide enough to include all indurated and ulcerated tissue. It is better to make this incision with the cautery, though in some of the cases here recorded such a plan was



Fig. 5.—(Case 10). Inguinolabial type showing extensive ulceration as well as hypertrophy associated with suppurative adenitis.

not adopted. One case, that was followed for eight years after vulvectomy, remained perfectly well except for a rectal stricture that required further dilatation.

In conclusion I append a brief record of the 13 cases included in the present study. It will be noted that four of these patients were seen in the services of my colleagues, Drs. Gellhorn, Crossen and Otto Schwarz, and thanks are due for permission to include them in the present analysis of the question.

CASE REPORTS

CASE 1.—Ophelia T., twenty-seven years, colored, two children, one stillborn and one living, came to Washington University Hospital in 1907 complaining of partial incontinence of feces and the formation of a lump in the genital region that had grown to the size of a lemon during her last pregnancy one year previously. Examination showed a rectovaginal fistula, a stricture of the rectum, ulcerations about the fourchette and urethra, and a nodular enlargement occupying the region of the clitoris and both labia minora. Antiluetic treatment produced but slight improvement. Vulvectomy and repair of rectovaginal fistula, followed by further treat-

ment, gave good results. She was delivered of a full-term normal child in 1912. When seen last, in 1915, there was no recurrence of the vulvar condition, although the rectal stricture and gummatous deposits in the rectum still required treatment. Microscopically, the organs removed, showed typical sclerosis and chronic infection.

CASE 2.—Mattie L., twenty-five years, colored, never pregnant, entered St. Louis Skin and Cancer Hospital, May 14, 1910, with a swelling of the vulva that had persisted for one year associated with ulceration over the perineum. It had been diagnosed as rectal cancer. Examination showed rectum uninvolved. Both labia and clitoris enlarged to size of a man's fist. Urethra normal. Antiluetic treatment caused no change in the mass; hence, on May 31, 1910, excision of mass. A latent tuberculosis of the lungs was also diagnosed and, after the operation, a pleuritic exudate developed, but this was gradually absorbed. No tubercle bacilli found in the mass removed, but numerous giant and epithelioid cells were found. There was also marked proliferation of the papillae of the vulvar skin and infiltration with lymphocytes and plasma cells.

CASE 3.—Mamie F., thirty-one years, colored, entered Barnes Hospital Dec. 16, 1914, with old luetic scars over body, no pregnancies, history of rectal abscesses three years ago, and for the last year a vulvar enlargement. No bleeding or discharge. Mass occupying left labium majus eight inches long and four inches wide with small base. Ulceration over perineum. No mention of urethral or rectal lesion. Wassermann positive. The vulvar skin was thick, wrinkled and cracked. Very slight tenderness. Refused treatment.

CASE 4.—Mattie J., thirty-seven, colored, entered Barnard Skin and Cancer Hospital August 22, 1919, five pregnancies, two miscarriages, luetic eruption at 23 years. Bubo in left groin one year ago. Since then vulvar swelling. Examination shows entire vulva seat of ulcerations serpiginous with raised border. Left labia edematous and enlarged. Rectum negative. Wassermann negative. Dueroy's bacillus not found. Tissue removed for microscopic study showed only chronic granulation. Refused treatment.

CASE 5.—Nettie T., twenty-five, colored, no pregnancies, entered Barnes Hospital Jan. 13, 1919, with history of labial swelling for past three years. Treated for lues in skin clinic during 1917. Tumor became painful two weeks ago. Temp. 99., no leucocytes. Labia minora and clitoris forming a mass 10x5x4 cm. Ulcer beneath it. Vulvectomy, by Dr. O. Schwarz, with good final result.

CASE 6.—Johanna O., thirty-four, colored, entered Barnes Hospital January, 1920, gave history of pruritus and swelling in left labia, the size of an egg, four years previously. In two years it was the size of a grape-fruit, and for the past year had grown to the size of a man's head. Antiluetic treatment and amenorrhea for past year. Pain and discomfort on walking during month before entering hospital. Examination showed a suppurating sinus in left inguinal region above Poupart's ligament. An indurated mass, 20x18x8 cms. in size, involving groin and left labia. Right labia also somewhat enlarged. An ulcer the size of a half dollar on top of the mass. Large whitish scars from former ulcerations. Urethra not involved. Papillary projections over vulva and perineum. Vulvectomy Jan. 15, 1920, by Dr. H. S. Crossen. Wassermann negative before and after operation. Histologically it is noteworthy that the entire mass showed evidence of chronic inflammation, plasma cells, lymphocytes, and sclerosis of connective tissue in the absence of any active ulcerations.

CASE 7.—Nona M., thirty, colored, entered Barnard Skin and Cancer Hospital May 14, 1919, one child, ulcers and vulvar enlargement of moderate extent that began one year ago. Pain on defecation. Examination showed considerable gen-

eral hypertrophy with many rectal tags. Stricture of the rectum. Vigorous anti-luetic treatment. Six salvarsans and many deep injections up to July 8, 1919, produced no visible improvement. Vulvectomy refused.

CASE 8.—Rose J., twenty-four, colored, entered Barnard Skin and Cancer Hospital October 11, 1917, one miscarriage. History of lues for previous year. Clitoris enlarged to size of a thumb with ulcer beneath it extending up to urethra. Attempt at autoinoculation from ulcer to test for chaneroid gave a negative result. Wassermann negative. Returned two years later, Sept. 15, 1919, with condition only slightly worse. Antiluetic treatment produced no change. On Nov. 8, 1919, vulvectomy. Mass removed included both labia as well as clitoris, somewhat pendulous, hard, nodular, with many ulcerations. It was three inches long and one and three quarter inches in diameter.

CASE 9.—Bessie K., twenty-six, colored, entered Barnard Skin and Cancer Hospital Feb. 11, 1920, four pregnancies, no living children, had a vulvar lump and ulcer for two years. Pronounced leucorrhea. Some dribbling of urine. Wassermann positive. Both labia involved in a mass the size of a fist with numerous ulcerations. Antiluetic treatment produced very slight change. Refused operation.

CASE 10.—Irene J., thirty, colored, entered Barnard Skin and Cancer Hospital Dec. 22, 1919, two pregnancies, one miscarriage, gonorrhea at 21. Present trouble began one year ago with pimple in right groin that was opened with a needle, but mass rapidly grew larger until it hung between thighs and interfered with walking. Wassermann positive. Entire right half of vulva involved in a hard mass with areas of ulcerations extending up to the right groin. Preliminary antiluetic treatment; then, on Feb. 19, 1920, operative removal of mass by Dr. G. Gellhorn. This mass was 26x16x5½ cms. and weighed 620 grams. Good operative result. Referred to skin department for further antiluetic treatment.

CASE 11.—Dora W., forty-two, colored, came to Skin and Cancer Hospital May 24, 1919, no pregnancies, history of rectal abscesses for five years and for two years an ulcer and warty growths on vulva. Small rectovaginal fistula. Wassermann positive. Radium in form of plaque over site of perineal ulcer applied tentatively by Dr. G. Gellhorn. No improvement following. Intermittent antiluetic treatment. Returned two and one-half years later with considerable increase in vulvar swelling, especially in region of the clitoris as seen by the two photographs. (Fig. 1.) On Sept. 15, 1921, vulvectomy and excision of perirectal ulceration.

CASE 12.—Emma P., twenty-two, colored, entered City Hospital No. 2, August, 1921, no pregnancies, very dull witted, stated that she had noticed a hard swelling of her genitals for about one year with a sore in that region. Examination showed a pendulous mass consisting of labia minora and clitoris with ulcerations around the urethra the mass being about the size of two fists. Wassermann negative, but spirochæte found in dark-field of ulcer. Refused operation and left hospital without treatment.

CASE 13.—Lillie M., twenty-nine, colored, entered City Hospital No. 2, September 17, 1921, in labor. She was delivered by version by Dr. L. Dorsett. This was her fifth living child. She stated that the tumor mass, hanging from the vulva, had been present for 11 years. During each pregnancy the mass became much larger and after delivery again returned to its former size. She had been operated for rectal fistula and abscess. Examination eight hours after delivery showed a soft pendulous mass the size of a child's head springing from the left labium minus. (Fig. 2.) Scars from old ulcerations visible on the inner aspect. No active ulceration. Urethra normal. The mass showed marked nodular papillary surface. Within 24 hours the edema had decreased and the mass was visibly smaller.

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(For discussion, see p. 320.)

ATRESIA AND STRICTURE OF THE VAGINA*

BY JAMES E. KING, M.D., F.A.C.S., BUFFALO, N. Y.

ATRESIA and stricture of the vagina are problems that not infrequently confront the gynecologist. They lay claim to his attention not because they of themselves are a source of suffering, but because they prevent the woman so affected from fulfilling her mission as a wife and mother. There is a voluminous literature on various phases of the subject. Most writers have confined their discussion to congenital absence of the vagina and the operative procedure for rectifying it. A review of the literature seems also to indicate that certain of the acquired forms have been regarded and described as congenital.

Atresias of the vagina may be divided into the congenital and acquired forms. Of the congenital atresias, imperforate hymen is the most frequent type. Absence of the vagina, strictly speaking, is not an atresia, inasmuch as in such cases a vagina never existed, but for convenience it may be placed under this heading. Finally transverse septa may also be found as a congenital anomaly. These defects are rarely discovered until puberty, when presence of the menstrual molimen with absence of flow, prompts an examination.

Congenital absence of the vagina is a rare anomaly and it is almost invariably associated with either a very rudimentary uterus or its complete absence. Indeed, cases that show an apparent absence of the vagina but in which there is found a well developed cervix and uterus, should be studied carefully, as it is very probable that they belong to the acquired rather than to the congenital type. Congenital types present no etiologic problem and they are interesting mainly from the viewpoint of their surgical treatment. It is not the purpose of this paper to enter into the discussion of these forms.

The acquired types of atresia are much more interesting. It is convenient to classify them in three groups, based upon the time of life when they occur; namely, those cases that develop during infancy and childhood, those that develop during the childbearing period, and those that develop after the menopause. This classification finds justification not only by reason of the different clinical aspects presented by each of the three groups, but more especially because of the distinct etiology found to cause the atresia during each of these three periods. Considering the etiologic factors in the three groups of our classification, we find the atresias produced during infancy and childhood to

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be due to trauma and vaginal infections. During the reproductive period they result from injuries and infections of labor, and very rarely to other vaginal infections, while after the menopause almost the sole cause is an atrophic vaginitis with a superimposed infection. Although the atresias produced during the childbearing period and after the menopause are interesting and worthy of discussion, only those atresias that develop during infancy and childhood will be discussed.

Atresias due to trauma during childhood present no question as to their etiology. The history of an injury, and the evidence of malformation and scar tissue about the vulva, clearly determine the causal factor. On the other hand, in the cases of atresia resulting from infantile vaginal infections, it is often impossible to obtain a history of the vaginal discharge and it may thus be difficult to establish the real cause of an atresia discovered in adult life.

Undoubtedly by far the most common cause of an atresia developing during childhood is infantile vaginitis. The bacterial cause of vaginitis in childhood is generally conceded. Grouped broadly, these infantile vaginal infections may be classified under two headings; those due to the gonococcus, and those due to other bacteria. With regard to the miscellaneous infections there seem to be many views, having but little foundation in scientific observation, that have found their way into many text books unquestioned. Most text books, for example, give first place to the exanthemata as a cause of vaginitis in children. The writer has never seen vaginitis associated with or following any of the exanthemata. Such cases he believes to be rare, and if they do occur, to be of short duration. However, children exhausted by any severe or long illness, or those suffering from malnutrition, are not infrequently subjects of vulvitis when cleanliness is not maintained. The possibility of a severe streptococcus ulcerative infection, or of a true diphtheritic infection of the vagina, is conceded. In such instances the great severity of the constitutional symptoms dominates the picture. A chronic purulent discharge in young children that bacteriologically shows no gonococci is not infrequently considered to be due primarily to a mixed infection. As a matter of fact, this mixed infection finds its origin in a gonorrhea and the persistence of the discharge is due to the pathology caused by, and remaining after the disappearance of, the gonococcus itself.

That the gonococcus causes a very large majority of vaginal discharges in children must be generally admitted. A committee representing the American Pediatric Society attempted by means of a questionnaire sent to hospitals and physicians, to obtain information on which might be based some definite data on this important subject. The result emphasized the fact that there existed among a considerable proportion of those approached, a failure to appreciate the real seri-

ousness and importance of gonorrhea in childhood, and it made it clear that there still remains much to be done in placing squarely before the general profession the real truth concerning vaginitis in children.

A discussion of the atresia due to gonorrhea in childhood necessarily comprehends a consideration of certain features of gonorrheal vaginitis. It is well established that gonorrhea of the vagina is a disease of infancy and early childhood. The stratified epithelium of the glandless membrane of the adult successfully resists attacks of the gonococcus, while the more delicate vaginal tube of the child offers a field easily infected by, and difficult to rid of, these germs. The epidemics in institutions are now well understood to be due to contact infections, through the media of a large variety of agents. A discussion of the various means by which the gonococcus may find entrance to the vagina of a child is not pertinent to this paper.

Of the clinical manifestations following infection it may be said that as in adults, they vary in different individuals. Certain cases present but a moderate discharge, that attracts little attention and soon subsides. In other children the vaginal discharge may persist for months. To understand the variation in the clinical course in these little patients, one has only to keep in mind the fact that the gonococcus is a pyogenic organism that causes ulceration, and that in any gonorrheal inflammation mixed infection is the rule. The clinical manifestation of a gonorrheal vaginitis in the period just following the infection, often proclaims the severity of the process, and makes easily understood some of the sequelae which are seen later in life. Other things being equal, the amount of discharge and its persistence will depend upon the extent of ulceration. A discharge will continue until the ulcerated vaginal areas have been replaced by healed scar tissue, or until apposing granulating surfaces become united, and the obliteration of those surfaces is thus accomplished. It is doubtless just as true in gonorrheal vaginitis in children, as it is in urethritis in the male, that the less marked lesions may heal, leaving no trace. In every case, however, in which ulceration and mixed infection are pronounced, sequelae are certain to result. It is obviously quite impossible to estimate with any degree of accuracy the percentage of permanent structural changes that follow vaginitis in children. Probably, however, it is not high, inasmuch as some men of large experience have never encountered a case. That these changes do not occur more frequently is rather surprising, when one considers the delicate vaginal membrane of the child, and the indifference and difficulties encountered in the treatment of these infections.

The structural changes found in the adult vagina as a result of gonorrhea in early childhood, may be divided in two groups: a narrowing of the vagina due to scar tissue involving to a greater or lesser degree its circumference, and a more extensive condition, consisting

of partial or complete obliteration of the vagina, brought about by the fusion of vaginal surfaces. It is seldom that either of these types is discovered until the woman marries. The first type may be found during a vaginal examination prompted by other conditions, or the stricture may interfere with normal married life to an extent that will lead to the discovery of its presence.

In cases belonging to the first group a wide variation in the extent of scar tissue is found but usually it is not sufficient to produce trouble. The examining finger comes in contact with a cord-like process felt in the vaginal wall. The lateral walls are the most frequent location. In view of the fact that such conditions do not interfere with normal processes, they possess but little clinical interest. The writer has met with a number of such conditions that were presumably the result of gonorrhea, but in only one could a definite history of a vaginal discharge in childhood be obtained.

In the cases belonging to the second group, the obliteration of the vagina naturally prompts an examination after marriage. In this group the vaginal defect is marked and the vagina is found almost completely closed, with the exception of the lower one, or one and a half inches. The vagina is represented by a pouch an inch or two in depth. Somewhere along the line which marks the fusion of the vaginal walls, is located the opening connecting with the uterus. This external opening may be extremely small and difficult to locate, and when found may admit only the smallest probe. Beyond this point the fusion of the vaginal walls will vary in extent. The fornices of the vagina in some instances may not be involved, while in others the vaginal walls may closely encompass, and be adherent to, the cervix.

The union that takes place between the vaginal walls is very firm. In the cases described, and in those seen by the writer, there has always been the small pouch representing the vagina just inside the vulva. This rather constant lower limitation to the vaginal adhesions may possibly be explained by the fact that the lower end of a child's vagina is gaping. If the labia be separated, and if the opening of the hymen be not too small, one may easily see the portion of the vagina just above the hymen as a cavity. At puberty the development of the levator muscles and the vaginal constrictors bring the lower part of the vaginal tube closely in contact. The fact of the imperfect vulval closure in the child may possibly explain why the bath tub commonly acts as the medium of infection in some of the institutional epidemics of vaginitis. The water of the bath finds ready entrance to the vagina, and if germ laden, infection is accomplished.

The writer's experience with acquired vaginal atresia as a result of infantile vaginitis, is confined to three cases.

The first was a young woman of nineteen who began menstruating at sixteen. With each period she experienced much pain, and the flow came very slowly. The

feeling complained of was that of pressure in the vagina. Increasing discomfort with each month's flow, prompted an examination. It was found that the vagina was closed an inch and a half from the hymen by the firm union of the vaginal walls. No attempt was made at this time to find the opening along the line of union. Later, under anesthesia, a small opening was found that admitted only a probe. The union of the vaginal walls was dissected for about one half inch. Above this was the vaginal cavity where an adhesion of much lesser extent was found and corrected. Following this procedure menstruation occurred without pain. A year later the young lady married, and although no examination was permitted, her married life was reported normal. The discomfort at menstruation in this patient was due to the small opening not permitting a sufficiently rapid discharge of the menstrual fluid. During the time when the discharge from the uterus became greater than could be drained by the fistula through the atresia, the accumulation produced pain and pressure. Based upon the best of circumstantial evidence the cause of this atresia was an infantile gonorrhea. The mother stated that when the girl was four years old a persistent vaginal discharge required treatment for nearly a year. The mother herself gave a distinct history of pelvic inflammation, following which she had had years of pelvic symptoms, and finally she was operated upon by the writer for a chronic gonorrheal pelvic pathology.

The other two cases of atresia may be briefly cited. A Russian Jewess, twenty-six years old, four months after marriage consulted the writer because intercourse was impossible. Examination showed the vagina to be represented by a shallow pouch. The opening connecting with the uterus could not be found. The patient was requested to return during her menstruation, at which time it was possible to locate the lower opening of an apparently tortuous channel. At operation extensive vaginal adhesions were found to almost completely obliterate the vaginal tube. Following this attempt to open the vagina, although there was much improvement, in two months a second operation was undertaken, followed by vaginal dilatation. Shortly after the second operation pregnancy occurred. The labor was terminated by a difficult forceps delivery in the hands of a competent obstetrician. The baby died. Examination three months after this labor showed considerable scar tissue in the vagina, but a lumen that admitted two fingers comfortably. Pregnancy again took place and at term the woman was delivered by abdominal section with happy results. No history could be obtained here of any discharge during childhood. The patient could not, however, give any information concerning her early childhood in Russia, and there was none of her family who could supply such information. While in this case all direct evidence of infantile gonorrhea was wanting, the atresia was in the writer's opinion undoubtedly due to such a cause.

The third case was a young woman of twenty-three, married three months, referred because intercourse was impossible. Examination showed that the vagina was closed an inch and a half beyond the introitus. At operation, after dividing the lower union, a small vaginal cavity was encountered, and above this the vaginal walls were found closely adherent about the entire cervix and united in front of it, in such a manner that it was with considerable difficulty that the os was finally located and the cervix freed by a careful dissection. Very shortly after the patient left the hospital she became pregnant. At the seventh month of pregnancy examination showed the cervix free of adhesions. The obstetrician in whose hands this patient was placed deemed it wisest to deliver by abdominal section. This patient was able to secure the information that in early childhood she had had a profuse discharge that persisted for many months. Although positive evidence proving the source of this discharge to be a gonorrhea is wanting, our knowledge today of such conditions justifies an assumption that the gonococcus was the exciting germ.

If we grant that all such cases of atresia and stricture are due to a gonorrheal vaginitis that existed in childhood, it presents a strong argument for more prompt and active treatment of these discharges.

The operative technic for the relief of atresia of the vagina must depend naturally upon the needs of each individual case. There are a few general principles that can be applied, however. In atresia due to the union of vaginal surfaces, the dissection should be most carefully done, and when possible it should be accomplished by the finger. The sharp knife, unless great care is used, will penetrate into the deeper layers of the membrane, thus favoring the development of a scar in the deeper structures. A denuded vaginal surface in contact with a similar denuded area, will result in their union. If, therefore, after separating an area of vaginal union, it is possible to do on one wall a plastic procedure that brings an area of normal epithelium opposed to the denuded area of the opposite side, the denuded area will in due course be covered by a modified epithelium, such as is seen in the scar of the lacerated perineum. Where this cannot be done, the surfaces separated must be kept apart by frequent packing with iodoform gauze heavily impregnated with vaseline.

The atresia due to stricture seems to present greater difficulties than the atresia due to vaginal adhesions. As a rule the scar of these strictures is deep and its base broad. Before proceeding with the operation itself the strictures should be most thoroughly stretched with dilators and finger, until sufficient dilatation is obtained to permit one to determine the limits of the scar. Good dilatation also affords greater room for any plastic work. Plastic procedures are difficult. If the scar be not too wide, a resection of a part of the circumference of the stricture should be done, substituting for the resected portion, a union of membrane drawn from above and below the scar. This procedure was helpful in one of the writer's cases. Whatever operative plan is adopted, the vagina should be systematically dilated as soon as possible following the operation. In two of the writer's cases pregnancy took place within four months after operation. It would seem that the vaginal congestion accompanying pregnancy renders contractions of scar less prompt.

The question as to how such patients are to be delivered must of course be decided in each case by the condition of the vagina. If a delivery through the natural passages can be terminated with safety to mother and child, there can be no question as to the advantage derived from the dilatation. It would seem that such cases might also present a valid indication for the induction of premature labor. If however, considerable resistance is offered to the progress of the head, the chances that a premature infant will survive the labor are rather remote. For the safety of the child abdominal cesarean section undoubtedly is the best procedure.

NITROUS OXIDE AND OXYGEN CONTINUOUS ANALGESIA
AND ANESTHESIA WITH REBREATHING, IN OBSTET-
RICS. TECHNIC OF ADMINISTRATION AND
SUMMARY OF RESULTS*

BY A. E. RIVES, PH.G., M.D., EAST ST. LOUIS, ILL.

THE WORLD-WIDE propaganda on painless childbirth and twilight sleep formed a nucleus for a greater future for motherhood than was anticipated. That the world is growing weaker and wiser is clearly demonstrated in obstetrics, childbirth becoming a more difficult problem in each generation, with the expectant mother well versed through the press and magazines of the advancement of the scientific methods of relief to be had by merely demanding them. We no longer believe that labor pains do not hurt and the old maxim of letting nature take its course in the sense in which it has always been applied in obstetrics, is a thing of the past. The demand for better obstetrics and safer analgesia and anesthesia must be respected. Today nitrous oxide is accepted as the safest analgesia and anesthetic for this purpose.

My personal experience with nitrous oxide and oxygen in obstetrics has been limited to private practice and dates from March 4, 1917. During this period I have kept complete records of each individual case, including the number of child in order of birth, urinary findings during pregnancy if abnormal, pituitrin if any, amount used and time given, time of beginning and termination of administration of the analgesia, ether used if any, amount of nitrous oxide used, calculations being on the basis of one hundred gallons for every two and one-half hours of continuous administration, lacerations if any, instrumental, difficult or abnormal labors, postpartum hemorrhage if any, condition of child, patient's version of entire procedure relative to amount of pain experienced, presence or absence of exhaustion following delivery, comparative flow of milk and results other than normal between date of delivery and date of last call.

There are a number of factors necessary to insure success in this work as with any other. The most important are, first, that the physician be a trained obstetrician; second, he must be thoroughly familiar with the technic of the administration of nitrous oxide and oxygen and must be able to differentiate between the stage of mild and deep analgesia and anesthesia, and must be able to interpret every sign and

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symptom with the patient as his guide, and an apparatus that will deliver known quantities of the gases and capable of changing proportions in any quantity quickly. Third and equally important, the intelligence and the physical and mental attitude of the patient. I insist upon an early engagement, a specimen of urine every ten days previous to the sixth month, and weekly thereafter, and the usual physical examination and suggestions.

During this antepartum period the doctor and patient become acquainted, confidence is established, and the nature of the analgesia is explained with much stress laid upon the importance of cooperation before and during delivery. This greatly helps to overcome the fright and lack of confidence resulting from the usual neighborhood advice.

One of the greatest advantages of nitrous oxide in obstetrics is that it can be given at the home as well as the hospital. Personally, I prefer the delivery at home whenever possible. The expense is lessened, with less fear and more contentment, with home comforts and surroundings. The sanctity of the joys of the birth are not interrupted by the embarrassment caused by the presence of strangers and strange surroundings.

By insisting upon being notified when the first symptoms of labor make their appearance, preliminaries are early arranged. My equipment consists of a fiber case, made especially for me, which carries one tank of oxygen and two tanks of nitrous oxide, a Gwathmey portable outfit, an obstetrical bag with complete equipment, and a nurse.

No preliminary narcosis is used except in a case of rigid os. Early in the first stage of labor, when the os has softened and dilated one and one-half to two inches in diameter, and sometimes less, I begin the analgesia, after again reassuring the patient of her safety and comfort, explaining the necessity of cooperation and describing the symptoms and sensations she is going to experience.

The position of the patient is prone, on the right side of the bed, the patient being properly sterilized and draped. The right hand is inserted in a sterile glove; and with my left hand I manipulate the machine, which has a long rubber tubing with the breathing bag and Gwathmey face piece at the other end. My nurse is trained in fitting the face piece on the face to exclude all outside air, and manipulating the rebreathing valve and the face control. Before beginning, the face control is closed until the bag is about one-half to two-thirds filled with the mixture of approximately 95 per cent of nitrous oxide and 5 per cent of oxygen. We begin with this mixture and continue until a stage of analgesia is reached with whatever changes are necessary in the mixture. Within from two to four minutes the patient is completely anesthetized, in which condition she is allowed to remain for from five to ten minutes. This is done for two reasons, first to estab-

lish a blood saturation of the gases which, when once established, renders the patient more acutely susceptible to any necessary changes of the mixture from time to time as labor progresses. The other reason is that in 90 per cent of all the cases under the effect of the nitrous oxide and oxygen, more so than any other anesthetic I have ever used, the os rapidly dilates, so that usually in from two to fifteen minutes, the first stage of labor terminates. At this time, the sac is ruptured and if indicated, a hypodermic of 5 m of pituitrin is given and the progress of labor is painlessly hastened. In place of the contractions and expulsive power being lessened and at longer intervals, as is sometimes the case with chloroform and ether, and always with scopolamin-morphine narcosis, they are more than doubled or trebled, the second stage being complete usually in from one-fourth to one-sixth the time of labor under any other circumstances, except instrumental or surgical.

In a short time the mixture required for the individual is found and is seldom changed until just before the termination of the second stage, when analgesia is deepened to nearly or complete anesthesia. The usual precautions are taken to prevent lacerations and at this time, I have sterile gloves on both my hands and the gases are not changed until the termination of this stage, when my nurse or myself, closes the nitrous oxide valve and opens wide the oxygen, allowing the mother to inhale pure oxygen for one to two minutes. The cord is then cut, and the mask is removed from the face of the patient.

During the entire procedure there is partial rebreathing, the bag being kept from one-half to two-thirds full, as near as possible. In nervous or excitable patients, a few breaths of air are given from time to time, when needed, as indicated by rapid, deep breathing, a tendency to excitement or cyanosis. Cyanosis is avoided throughout and semi-consciousness is maintained, likewise the ability of the patient to respond quickly to suggestions at all times.

The immediate family is allowed to be present, but they are requested to remain quiet, as the patient is instructed that I will be the only one to prompt her and that she should respond quickly each time. The result is that she bears down or remains quiet at my command.

The placenta is delivered under analgesia, as are repairs of the perineum made if any laceration.

The type of the individual must govern the depths of the analgesia and her susceptibility and acceptibility, physiologically and mentally, must be recognized and respected. The hysterical primipara is difficult to handle where the analgesia is begun before she has had enough hard pains to make her appreciate the difference. I have found, as yet, no contraindications for nitrous oxide in obstetrics when properly administered.

Rebreathing plays an important part in anesthesia and analgesia in

major and minor surgery as well as obstetrics, a fact that has been denounced in no mild terms until a few years ago, on account of numerous postoperative and postpartum, disagreeable and dangerous symptoms that resulted from lack of knowledge of its application, effect and control. By close observation, the amount of rebreathing suited to the individual is soon discovered and the result is a smoother maintenance, more comfort to the patient, and economy of the gases. There is less tendency to shock, less depression and a lessened postpartum exhaustion.

During my first year I conducted my cases with interrupted analgesia, the patient taking three or four deep breaths of a 95 per cent-5 per cent mixture, just before the onset of each pain, holding the last one and bearing down as long as possible. The disagreeable feature of this was that I had failures because I was unable, in some cases, to "beat the pain." Unless the analgesia is established before the height of the contraction, the effect is lost. I observed in the hospitals while giving gas-oxygen anesthetics for major and minor surgical procedures that a great many cases could be carried from one-half to two and three hours on a light anesthesia or deep analgesia by continuous administration with partial rebreathing, and it occurred to me that this method should be applicable in obstetrics. It has proved successful in 94 per cent of my obstetrical cases in the last three and one-half years.

The total number of deliveries during this four and one-half years were 238, of which 121 were primiparae and 117 multiparae; of the babies, 132 were boys and 106 were girls; 218 cases delivered at home and 20 cases in hospitals. Ages of the primiparae were from 16 to 39 years with average of 22.8 years. The following table contains further details of interest.

	PRIMIPARAE	MULTIPARAE
Total average time of delivery	1 hour, 13.4 min.	31.2 min.
First year, with interrupted administration, average time	1 hour, 47.3 min.	40 min.
Second year, with continuous administration, average time	1 hour, 15.1 min.	39.1 min.
Third year, continuous administration, average time	1 hour, 19 min.	29 min.
Last one and one-half years	1 hour, 6.6 min.	26.4 min.
Abnormal presentations—face	4	1
2 of primiparae delivered instrumentally, and 2 by version: multip. normal.		
Abnormal presentations—breech	7	3
Instrumental to perineum	7	2
Instrumental complete	4	
Instrumental, high application	3	
Rigid cervix	3	
No relief from pain		11
Ether at delivery		39
Over 10 days in bed		5

One phlebitis developed fifth day, right leg, recovery complete in four weeks
 One 12 days, 3rd degree laceration, face presentation, 12½ lb. child, rupture of sac 4 days previous to delivery, instrumental.
 Two—pyosalpinx, with temperature 104°, with chills, 36 and 38 hours after delivery. Recovery at 5 and 8 weeks.
 One hemorrhage during and after delivery from laceration, recovery 2 weeks.
 Postpartum hemorrhage None
 Stillbirths 2
 Macerated fetus, premature, 6½ and 7 mo. 2
 Atrophy of cord 1
 Full term that died within 10 days; One, congenital hemophilia, 7 hours. One, anencephalus, 2 hours.
 Full term that received oxygen after birth. All lived. 6
 Types of pathological conditions existing in the mothers were pulmonary tuberculosis, hemiplegia, asthma, cardiac lesions, nephritis, diabetes, high blood pressure.

SUMMARY

I find less cyanosis in the babies but have been unable to get a record of the difference of loss of weight. Absence of postpartum hemorrhage, less surgical shock, less postpartum exhaustion, noticeable by the patients themselves where one or more deliveries have been made previously, with and without other anesthetics. No maternal deaths, greatly lessened first and second stage and more comfort to the mother and a greater satisfaction to the patient and family. Saving of time for the obstetrician.

MURPHY BUILDING.

INDICATIONS AND CONTRAINDICATIONS FOR THE USE OF PITUITARY EXTRACT IN OBSTETRICS*

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IN THE Department of Obstetrics and Gynecology at the University Hospital pituitary extract has been used since the year 1911 without any very serious accidents directly attributable to the drug. It has been administered for the induction of labor, during labor, and also during the puerperium. In 1914 Seeley analyzed forty cases from the clinic and, although much has since been learned, the conclusions which he reached are for the most part still accepted as correct. In 150 additional cases an attempt has been made to elaborate on and extend the use of this drug.

The preparation used during the majority of our experiments is "pituitrin" manufactured by Parke, Davis & Company, of Detroit. Occasionally it has been necessary to substitute "pituitol," a Hollister-

*Abstract read before the Section on Gynecology and Obstetrics, Michigan State Medical Society Annual Meeting, May 24-26, 1921, Bay City, Michigan.

Wilson laboratory preparation. The action of the two preparations in so far as our observations have advanced has been identical. One cubic centimeter of this solution is equivalent to 0.1 grams of the fresh gland. Surgical "puitritin" also marketed by Parke, Davis & Company has been used but its potency is approximately twice that of the obstetrical preparation and therefore when used not more than one-half the customary dose has been administered.

The dosage has varied according to the indication for its use from 3 minims to 1 c.c. Our maximum fractional dosage has never been more than 3 c.c. in twenty-four hours. Watson in a recent paper has advocated much greater dosage, having administered in cases of induction of labor as much as 8 to 10½ c.c. in ½ c.c. doses at intervals of one-half hour, while Bandler has given 12 to 14 c.c. in twenty-four hours without disastrous results.

The extract should be injected intramuscularly, either directly into the skeletal or into the uterine muscle. For the usual obstetrical case satisfactory results are obtained by injection into the gluteal or deltoid muscles. In cesarean section and postpartum hemorrhage it may be given directly into the uterine muscle.

INDUCTION OF LABOR

Our results in cases of induction of labor have been more successful than those reported by Seeley, Mundell and Bandler but not as successful as those of Watson, Stein and Wilson. They compare quite favorably with those reported by Adair. Forty-five individual cases ranging from the eighth month of pregnancy to three weeks' post-maturity were subjected to induction of labor. Thirty-one, or 69 per cent, responded to one of the methods mentioned below. Of these 31 cases in 26, or 65 per cent, labor was brought on by means of a combination of castor oil, quinine, and puitritin. Five were induced by the insertion of a Voorhees bag and repeated small doses of puitritin. Fourteen, or 35 per cent, did not respond sufficiently to the combination of castor oil, quinine, and puitritin to bring on labor.

The method which in our hands proved most successful was the administration by mouth of one to two ounces of oleum rici, followed two hours later by ten grains of quinine sulphate. The quinine was repeated and at the time of the last doses of quinine five minims of puitritin were injected intramuscularly followed two hours later by a second and sometimes a third dose of pituitary extract. Not more than three injections of this extract were administered during a single attempt at induction. The object of the combination of these drugs is to secure a maximum oxytocic action on the uterus. The castor oil besides congesting the pelvis has a direct irritant action on the uterine musculature. The quinine acts as a continuous oxytocic, while the puitritin has a rhythmical stimulating action of relatively short dura-

tion. Therefore it is most important to administer repeatedly the pituitrin in order to secure a completion of the onset of labor. Many patients apparently go into labor but the uterine contractions do not continue long enough to secure sufficient cervical dilatation and separation of the ovum unless the drug is repeated two to three times.

There were sixty-nine attempts made to induce labor by means of the aforementioned drugs. A few attempts, namely ten, were made with only castor oil and quinine, about an equal number with pituitrin alone. The results as far as successful inductions are concerned cannot be compared with the combination of the three drugs. It is quite evident that in some individual cases repeated attempts were made to bring on labor. As many as six courses at intervals of three to six days have been given to a single case. It is very interesting to note the increasing success with this method as the gravida reaches maturity and postmaturity. At eight months two attempts were unsuccessful; at eight and one-half months one attempt was unsuccessful; at nine and one-fourth months one attempt was successful while four were unsuccessful; at nine and one-half months two were successful while nine were unsuccessful; at nine and three-fourths months one was successful and six unsuccessful. At ten months nineteen were successful while six were unsuccessful; at ten and one-fourth months one was unsuccessful; at ten and one-half months five were successful and at eleven months one was successful. Judging from these results it is quite apparent that the irritability of the uterus and its response to oxytocic drugs increases as term is approached. Pauliot and others have reached the same conclusion. Furthermore it can be concluded that for bringing on therapeutic abortion or premature labor, pituitary extract alone or in combination with other drugs is practically useless.

Resort to the Voorhees bag for induction of labor had to be made in two cases of polyhydramnion. Both pregnancies had gone beyond term and although as many as six attempts with castor oil, quinine, and pituitrin had been made, all were unsuccessful. Undoubtedly the uterine musculature had been so stretched and thinned that it could not be stimulated by medicinal irritants. Following the introduction of the Voorhees bag one can administer small doses of pituitrin and thereby shorten the onset of labor pains from six to ten hours.

This drug is also a great help in differentiating false from true labor pains. A few minims of the drug will augment true pains so that there is no further doubt about the status of the uterine irritability. In cases of premature rupture of the membranes during the latter months of pregnancy or at term, small doses of pituitrin will influence the uterus in the same way as after bagging. Many cases of intra-partum infection due to long exposure have undoubtedly been prevented in this way.

FIRST STAGE OF LABOR

Our experience with pituitary extract during the first stage of labor has been very limited. Except for those rare cases of primary uterine inertia its use during this stage is most dangerous. There were six labors complicated by primary inertia. Five of them responded to small doses of the extract but the sixth one was not benefited. In two of the cases the pains became continuous and the uterine contractions so severe that the fetal circulation was considerably embarrassed. It became necessary to complete the labor in both cases by internal podalic version under deep anesthesia. A third case was similarly affected. The uterus went into a state of tetany and the labor was terminated by manual dilatation of the cervix and forceps extraction. The baby of this last case suffered from asphyxia pallida and was resuscitated with great difficulty.

Primary uterine inertia can and should be recognized before labor. The uterus is atonic and flabby and indifferent to stimulation; the blood pressure is generally low and the calcium index is subnormal. Bell advises that such a state be treated by the oral administration of calcium salts and the dried extract of the posterior lobe (gr. v, t.i.d.) or the whole pituitary gland (gr. xx, t.i.d.). He has seen women with bad obstetric histories in regard to primary uterine inertia, go through easy and rapid labors after the treatment described.

There may be another indication for the use of pituitrin during the first stage of labor, namely in cases of marginal or partial placenta previa with incomplete dilatation of the cervical os and rupture of the membranes. A small dose of the extract in some cases may be sufficient to force the presenting part down into the pelvis and against the placenta. The head then acts as a very efficient tampon.

SECOND STAGE OF LABOR

"It is probable, other conditions being suitable, that the use of pituitrin in secondary uterine inertia, a very common condition, far exceeds all other applications of the effect of this preparation on the uterus." That is Bell's opinion of the extract when used as an adjunct during the second stage. Bandler speaks even more favorably of the preparation. He claims that by the administration of the drug he has excluded the use of forceps except in sudden emergencies and that he has not used them at all in private practice for over two years. Mosher's expression fits in with our opinion of the value of this drug much better than either of the previous two. His dictum, namely, "To a mother who has had the test of labor with an inability to deliver a head already on the perineum, it is a boon. To a primipara in the first stage of labor it is a menace" can be universally adopted by those practicing obstetrics.

It has been suggested to the writer, after having observed Doctor Irving W. Potter "iron out" a perineum for selective version and extraction that his technic can be applied to the vulval outlet of primiparae. After completion of the first stage of labor and with the patient fully anesthetized the perineum can be completely dilated with the aid of green soap. Then the patient can be kept in the obstetrical degree of anesthesia and the labor completed by the administration of 0.5 c.c. of pituitrin. This procedure has been carried out in a limited number of cases but cannot as yet be recommended for adoption.

Bell has advocated the combining of pituitrin with scopolamine pantopon anesthesia (twilight sleep) for shortening the period of labor. In our hands twilight sleep has not been a success but in those cases with which we have had experience the oxytocic is of value in completing the prolonged labor. Stein's results in combining nitrous oxide and pituitrin have been excellent. We are inclined to concur with him in regard to this technic.

Any practitioner who has used pituitary extract in either the first or second stage of labor must have at some time in his career found it necessary, because of an abnormal fetal heart, to complete a delivery with forceps. Frequently the infant is in a state of livid or pallid asphyxia. Occasionally it is stillborn and sometimes it does not show symptoms until later in life. The pituitrin circulating in the maternal blood causes rapid, recurrent and more forceful uterine contractions, shutting off the placental circulation and also directly compressing the fetus. Kerley, Holt, Heard, Norris and Chapin and Pisek have called our attention to the late effects of pituitary extract on infants. They have found in many of their cases at autopsy meningeal and cerebral hemorrhages which in the living child lead to paralysis, epilepsy and idiocy. In view of these findings and the frequent disastrous effects to the mother should we not as medical men be most conservative in the use of this popular drug?

THIRD STAGE OF LABOR

Bell mentions that Strassman and others observed that when pituitary extract was administered during the first stage of labor, the third stage was much shortened. Advantage has been taken of this suggestion and one cubic centimeter has been injected deep intramuscularly immediately following the birth of the infant.

Our results in the first 135 consecutive cases have been so uniform and offer such brilliant hopes for the future that we feel justified in reporting them at the present time. The amount of blood lost during delivery, the length of the third stage of labor, the method of expression, and the mechanism of separation of the placenta and frequency of postpartum hemorrhage have been recorded and analyzed.

The loss of blood was accurately measured by placing a flat douche pan under the patient as soon as the second stage was completed. The hemorrhage occurring before the separation of the placenta, at the time of separation and that after separation was used in the estimation. The loss varied from three cubic centimeters to 840 cubic centimeters for the normal cases, the average being 255 cubic centimeters. Seven cases were excluded from this estimate; six had adherent placentae due to a syphilitic chorionitis and prematurity. The actual loss of blood in these six cases was 270 cubic centimeters, 360 cubic centimeters, 600 cubic centimeters, 840 cubic centimeters, 1050 cubic centimeters and 1800 cubic centimeters. The seventh case was complicated by a marginal placenta previa and a loss of 2010 cubic centimeters of blood.

The length of the third stage of labor in the normal cases varied from one to thirty-two minutes, the average being 12.1 minutes. Five of the seven cases mentioned above were excluded because of adherent placentae. These placentae remained *in utero* forty-three minutes, one hour and eighteen minutes, two hours and thirty-three minutes, two hours and fifty minutes and twenty-one hours and thirty minutes.

The separation of the placentae in 69 per cent of the cases was by the Schultze mechanism, the fetal surface appearing first. This method of separation is acknowledged as the most favorable and accompanied by the least amount of bleeding. The remaining 31 per cent except two placentae which were manually removed, separated by the Duncan mechanism.

The delivery of the placenta was completed in 94 per cent of the cases by modified Credé expression. The remaining 6 per cent were cared for as follows: four cases of adherent placentae, two by true Credé and two by manual removal, two by the Michael Reese method of expression and one came away spontaneously.

The height of the fundus of the uterus above the symphysis pubis one hour after delivery averaged 15.9 cm. for full term pregnancies.

When these results are compared with controls and also with the textbook picture of the third stage of labor, it will be found that the third stage of labor has been materially influenced by the pituitrin. The loss of blood was reduced from 330 c.c. in the controls and 300 to 500 c.c. (Williams) to 255 c.c. in our pituitrin cases. The third stage was shortened from thirty-five minutes in the controls and twenty to thirty minutes (De Lee and Williams) to twelve and one-tenth minutes. The methods of separation and expression were kept in the same ratio one to another as those of the controls as well as those of the textbooks. The frequency of adherent placentae and complications might

appear unusually high, but it must be remembered that approximately 20 per cent of our pregnancies are complicated by lues.

We have not observed any cases of hour-glass contractions. It is possible but not probable that in partially adherent placentae especially in premature labors this complication may occur. We believe, however, that the intermittent retraction and contraction of the uterus would have a tendency to free such placentae.

POSTPARTUM HEMORRHAGE

Pituitary extract as an etiologic factor in the causation of postpartum hemorrhage was not in our hands an important one. When the drug brings on tetanic contractions of the uterus followed by atony then, of course, it can be blamed for the condition. Fortunately, because pituitrin is only rarely used during the first and second stages, this has never been our experience.

For the treatment of postpartum hemorrhage the usual method of intramuscular injection of 1 c.c. of the solution was used. De Lee suggests in such cases that the drug be injected directly through the abdominal wall into the uterine muscle. Naturally the hemostatic effect is much more rapid. Its action on the uterine muscle is not of as long duration as ergot preparations but the length of time necessary for it to circulate in the arterial system to stimulate the uterus to contract is three to five minutes, while intramuscular injections of ergot take some fifteen to twenty minutes.

CESAREAN SECTION

Formerly pituitrin was administered by the usual method of intramuscular injection at the time of, or immediately after, the removal of the placenta. More recently operators have infiltrated the uterine incision with 1 or 2 c.c. of the extract. When used in this manner the closure of the uterine wound is greatly facilitated. An excellent procedure recommended by many operators is to supplement the action of pituitrin by injecting intramuscularly at the beginning of the operation one of the sterile preparations of ergot. Then one secures besides the immediate effect of the pituitrin the lasting and tetanic action of the ergot. During the postoperative period of cesarean section cases repeated small doses of either the obstetrical or surgical preparation of pituitary extract may be used most efficaciously.

CONCLUSIONS

1. At maturity labor can be induced in about 65 per cent of the cases by oral administration of castor oil, quinine and repeated small intramuscular injections of pituitary extract.

2. For the treatment of primary inertia the extract should be used most cautiously and only in very small doses.

3. Judiciously pituitary extract can be used to great advantage in the cases of secondary inertia.

4. The third stage of labor can be most favorably influenced by the intramuscular injection of 1 c.c. of the extract.

5. Pituitary extract should be included in the obstetrician's armamentarium for combating postpartum hemorrhage.

6. The extract facilitates the closure of the uterine wound in cases of cesarean section.

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REPORT OF A CASE OF B. WELCHII BLOOD STREAM INFECTION OF UTERINE ORIGIN*

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MRS. B. H., age twenty-three, para ii., was admitted to Long Island College Hospital (No. 3605) by ambulance on August 2, 1921. She was acutely ill, and stated that three days previously, believing she was two months' pregnant, she inserted a slippery elm stick into the uterus for the purpose of producing an abortion. Almost immediately she began to bleed and passed numerous clots. The bleeding continued that night but ceased on the following day. Twenty-four hours later, believing that the ovum had not been passed, she took a mustard foot bath after which she began to flow, vomited, had a severe chill, followed by a headache but was not particularly feverish. The following day, that is forty-eight hours after the uterine bleeding first began, she was very feverish and weak and for the first time called a physician who made a diagnosis of an inevitable abortion and recommended hospital treatment. This she accepted and entered the hospital, as stated above, at 11:00 A. M., Aug. 2, 1921.

Past and menstrual histories, negative. Obstetrical history: One child, two years old, normal delivery and puerperium.

*Presented at a meeting of the New York Obstetrical Society, November 8, 1921.

Physical examination on admission showed a young adult female, acutely ill, skin dry and flushed, conjunctiva and skin deeply jaundiced, lips and skin dry and a marked fetor from the mouth. There was definite cyanosis of the lips and finger tips with an associated coldness of all extremities. Temperature 104, pulse 120 regular, fair quality, respiration 34. Head, eyes, ears, nose negative. Teeth in poor condition, many fillings, slight gingival infection. Tongue dry and covered with a thick white fur. Tonsils and pharynx, lungs and breasts negative. Heart muscular tonus fair, moderate venous pulsations in the neck veins. Pulse 120 fair quality. Abdomen moderately distended and tympanitic throughout, no masses palpable, no abnormal rigidity, marked tenderness in both lower quadrants, particularly on the right side.

Pelvic Examination.—Multiparous introitus, fair pelvic floor with relaxed levators, some relaxation of the anterior vaginal wall. Cervix bilaterally lacerated, soft, open, admits one finger, points in the axis of the vagina and is quite sensitive on motion. Uterus the size of a two months' pregnancy, soft, boggy, and retroverted to the first degree, movable and very sensitive. There was moderate tender infiltration in the left broad ligament. Exudate is more extensive and more sensitive in the right fornix but is still confined to the pelvis. Adnexa not palpable. The entire pelvis is extremely tender and painful on manipulation.

Diagnosis.—Septicemia following septic abortion and old laceration of the cervix and pelvic floor.

Laboratory Findings.—Red cells 3,000,000; white cells 51,200; polys 89; small lymphocytes 11 per cent; hemoglobin 60 per cent; blood pressure, 100/68.

Treatment.—Hypodermoclysis 750 c.c. was given immediately and blood for blood culture taken at this time. The Fowler position, ice cap to lower abdomen, low enema followed by Harris drip of 5 per cent glucose in 2 per cent bicarbonate of soda solution. Digalen minims 20 every four hours, alternating with camphor in oil 30 minims and enough morphia to quiet the patient.

Follow Up Notes.—Aug. 2, 1921, 6:00 P.M. Patient irrational, had two chills since admission. Temperature remains 104.2°, pulse 120 but of good quality. Cyanosis of the fingers and lower portion of the forearm more marked. 8:00 P.M. Patient delirious, very restless and noisy. Cyanosis of extremities more marked. Temperature 105°, pulse 140, irregular, weak, respirations 40 and shallow.

Aug. 3, 1921, 9:00 A.M. Patient having chills about every half hour, almost constantly shaking. Pulse 130, bad quality. Respiration 50 and shallow. 6:30 P. M. Patient semicomatose for last few hours. Had to be restrained on several occasions. Had repeated chills about every twenty minutes, very cyanotic. Respirations irregular and shallow. Definite rigidity of neck, pulse 140, weak, thready and imperceptible at times. Crepitation felt in both inguinal regions, more marked on right side. 7:30 P.M. Pronounced dead 37 hours after admission and 109 hours after passing the elm stick into the uterus.

Autopsy Findings (by Dr. A. Murray).—Body well nourished, rigor mortis present, no marks of violence. Body jaundiced throughout, crepitates and enormously swollen. Both lungs showed intense congestion with a possible septic pneumonia. Pericardial sac contained two ounces of bloody fluid, gas bubbles are seen in the epicardium and throughout the myocardium. Heart normal in size, all valves normal, myocardium very soft. Spleen is firm, congested, and about normal size. Both kidneys contain gas bubbles throughout but otherwise apparently normal. Adrenals normal. Stomach pancreas, intestines, and gall bladder all apparently normal. Liver weighs 1447 grams and is filled with gas bubbles. Uterus very soft and contains the remains of placenta. Gas bubbles over the surface of the uterus and broad ligaments. All organs showed marked autolysis.

Microscopic Findings.—Spleen, intense congestion and a few gas holes. Pancreas

showed areas of necrosis. Liver riddled with "gas holes" throughout and stained sections show many *B. Welchii* about "gas holes." Considerable fatty infiltration and autolysis. Kidneys advanced necrosis. Lungs edematous and congested.

Cause of Death.—*Bacillus aerogenes capsulatus* infection.

Blood Culture Reports.—Aug. 2, 1921, on admission, specimen of blood sterile. Aug. 3, Blood culture showed numerous *B. Welchii*. Aug. 4, Smear of; 1. Heart blood large number of capsulated gram-positive rods. 2. Peritoneal fluid large numbers of capsulated gram-positive rods. 3. Pus from uterus, gram-positive and gram-negative rods and streptococci.

Cultures of heart blood showed enormous numbers of *B. Welchii* in pure culture. Peritoneal fluid enormous numbers of *B. Welchii* in pure culture. Pus from uterus showed numerous *B. Welchii*, *B. proteus*, and staphylococci.

COMMENTS

Since Professor Wm. H. Welch of Johns Hopkins first described the *B. aerogenes capsulatus* in 1891 surgeons have reported innumerable cases of "gas gangrene" both in civil and military practice. During the World War many thousands of cases of infections by "the gas-producing group of microorganisms" occurred and the literature from 1917 to 1920 is literally full of dissertations upon this very interesting and usually fatal infection. Perhaps no other surgical subject usurped as much attention along the front line hospitals as did the management of these infections and due to this fact we undoubtedly know far more today than we would have otherwise known. Regarding the puerperal and postabortal infections by this microorganism we know comparatively little except in so far as our surgical confreres have informed us. Only a very few completely detailed cases with bacteriologic and pathologic reports have been made. Curiously enough Professor Welch reported in 1891, the first case of puerperal sepsis caused by the *B. aerogenes capsulatus*. Since this time Dobbin, P. Ernst, Graham, Stewart and Baldwin of Columbus, Ohio, Krönig and Menge, E. L. Hunt, have studied and reported a few cases of puerperal and postabortal infections that were either caused by *B. aerogenes capsulatus* or in which it played an important rôle. Herbert V. Williams found the bacillus complicating a case of suppurative pyelitis. At autopsy the body presented all the characteristics of *B. Welchii* infection.

The symptoms are those of a profound toxemia, e.g., high temperature, rapid pulse, and respiration, chills, sweats, dryness of the mucous membranes and skin, cyanosis and acidosis. There have been many and varied explanations of how death is caused by the *B. Welchii* but perhaps Bull and Pritchett are correct in their assumption that death is produced by a specific bacterial toxin and not by a blood stream invasion of the microorganism or by an acid intoxication (butyric, succinic). It is generally believed that when the organism is found in the blood stream, and there are very few case reports where blood cultures were positive, circulatory failure has begun and since the blood stream is at this time poorly oxygenated or even in certain parts

or the body devoid of oxygen, the *B. Welchii* begin to multiply very rapidly and within from four to forty-eight hours death ensues. Following death their growth is extremely rapid and within a few hours unless the body is kept on ice it is swollen to twice its normal size or even larger. There is marked crepitation and upon opening the ab-

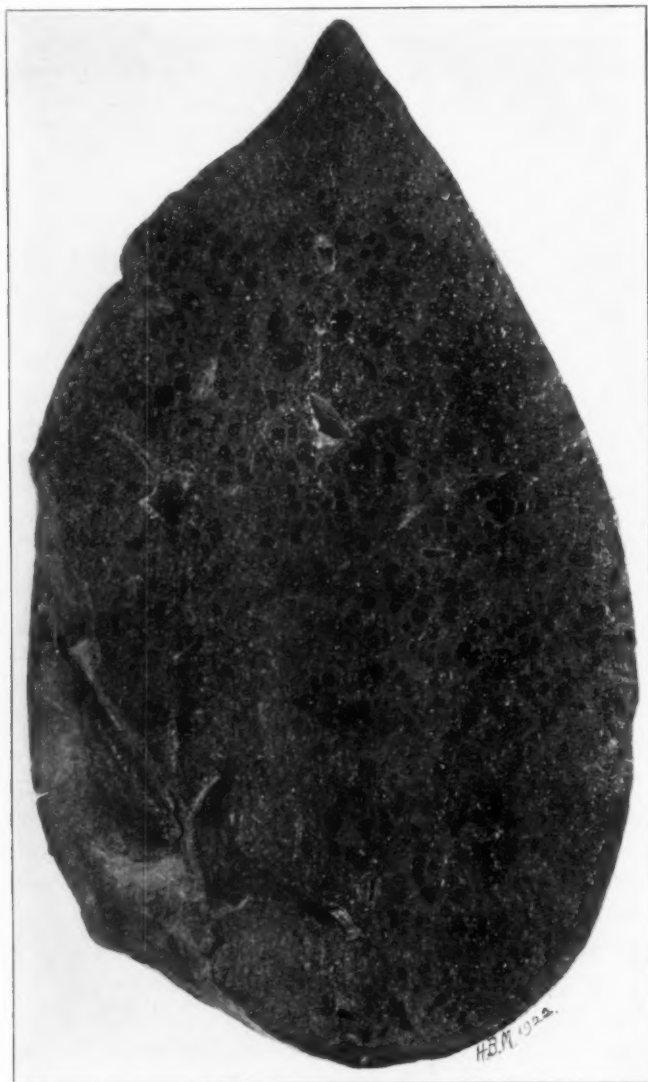


Fig. 1.—Photograph of gross section of liver from case of *B. Welchii* infection, showing surface riddled with "gas-holes",—the so-called "foamy liver."

dominal or other cavities there is escape of gas. The gas burns with a blue flame and is composed largely of hydrogen with some CO_2 and a small percentage of nitrogen (Hunt).

Treatment.—The management of puerperal and postabortal infec-

tions by *B. aerogenes capsulatus* is expectant. If the diagnosis is made early enough, cleansing of the uterine and vaginal cavities of all clots, dead tissue and other debris that is known to grow these microorganisms is indicated. I could find no report where hysterectomy or other operative procedure in such cases had been done and indeed it would seem a useless procedure. Simultaneous with the diagnosis,

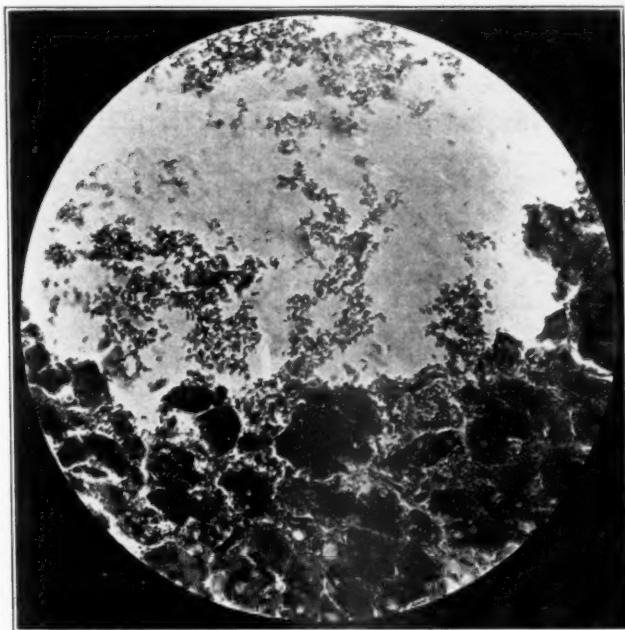


Fig. 2.—Microscopic section of liver tissue showing *B. Welchii* infection. Section shows edge of a "gas-hole" with bacilli in between liver cells and lying loose in "gas-hole."

the specific antitoxin as recommended by Bull and Pritchett or Henry and Lucy or any standardized antiserum should be administered forthwith. Transfusion may offer something but as yet there is no data to prove or disprove the efficacy of this procedure.

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Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS. THIRTY-FOURTH ANNUAL MEETING HELD AT ST. LOUIS, MO., SEPTEMBER 20, 21, AND 22, 1921

(Continued from the February issue.)

DR. CHARLES L. BONIFIELD, of Cincinnati, Ohio, read a paper entitled **Carcinoma Uteri**. (For original article see page 250.)

DR. ROLAND E. SKEEL, of Los Angeles, Cal., presented a paper entitled **Some Phases in the Evolution of the Diagnosis and Treatment of Cancer of the Cervix**. (For original article see page 252.)

DR. G. VAN AMBER BROWN, of Detroit, Mich., read a paper entitled **Valuable Methods Used to Extend Operability in Advanced Cancer of the Cervix**. (For original article see page 263.)

DR. GEORGE W. CRILE, Cleveland, Ohio, read a paper entitled **The Control of the Mortality of Abdominal Operations for Cancer**. (For original article see page 272.)

DISCUSSION OF THE PAPERS OF DRS. BONIFIELD, SKEEL, BROWN AND CRILE.

DR. GEORGE GELLHORN, ST. LOUIS, MISSOURI, (by invitation).—I rise chiefly to applaud the paper of Dr. Skeel. Hardly ever have I heard or read as excellent an exposé of the whole subject. I would like to make just one comment. In one of his conclusions Dr. Skeel suggests that in borderline, or inoperable cases of cancer of the cervix, the use of the thermocautery should precede the radium application. On the strength of a rather extensive experience gained at the Barnard Free Skin and Cancer Hospital in this city, I venture to say that by doing so one would deprive himself of a very valuable filter. No filter that we can devise in any way takes the place of the filter supplied by Nature, and by thrusting radium needles into the diseased tissues themselves, the latter will act as a very efficient filter.

On the other hand, if the tumor be removed by curet or cautery, there are very thin walls left between the cavity and the adjoining organs, and it was due to that practice that we had a number of fistulae in former years when we did just what Dr. Skeel advocates. Now that we eliminate all kinds of preliminary surgery, such fistulae have not occurred and the palliative result of radium has been even better than before.

DR. WILLIAM SEAMAN BAINBRIDGE, NEW YORK CITY.—The consensus of opinion today is that we have more careful dosage and deeper effects of x-ray, with more refined technic; radium is emphasized as a more important agent with better

technic and larger dosage. The German school is divided into two very hostile camps; the first advocating that the x-rays should replace all surgery in cancer of the uterus and that, very soon, radium will be forgotten; and the second insisting that the combined method is the only worth while one, using the x-rays externally and radium internally. Sittenfield says that surgical work on uterine cancer is practically ended and that in ten years it will be superseded by the x-rays and radium. Others of our colleagues say there is nothing in these two agents to be hoped for. Hadley remarks that surgery should be employed as heretofore, but with finer technic, and that x-rays and radium should be tried as aids to the surgeon.

Such papers as Crile's, and others, that we have heard today make us realize the difference between surgery and surgery. As the application and dosage of radium and the x-rays are being perfected, it is for the surgeon to prevent cancer by early surgery, while groping for its cause. It is important to eliminate scars and other contributory factors, and the duty of the surgeon is to dwell more upon the prevention than the cure of the disease.

Pinch, the head of the London Radium Institute, is an advocate of radium and the x-rays, and says that "surgery still holds its place, but radium, a pocket x-ray as it may be called, and the x-rays are on trial but seem to warrant the belief of their being great additions in the treatment of cancer of the uterus. However, the extreme views expressed by German observers, and recently by some Americans, are unfortunate, for the facts do not justify their conclusions and only bring discredit upon the whole problem before us. Remember that radium and x-ray may cause harm as well as good. Let us give them a fair trial. Let us not forget, while testing these things, that surgery is our mainstay."

The question of tying off the larger blood vessels has been discussed. In 1908, and again in 1911, I published papers advocating the starvation ligature and lymphatic-block operation, and in 1913 read another paper on the same subject before this Society. Why have we been so slow in taking up this procedure? Why not ligate and block even though radium and the x-rays are to be used? To ligate both internal iliaes, both ovarians, and the sacralis media, controls the blood supply to the pelvic organs, checks the local nutrition, and stops the rapid spread of the disease. I have cases living today, many years after operation, who are apparently perfectly well. Of course, most of the cases died, but they had been given relief from pain and hemorrhage for a time.

At Guy's Hospital they are doing the starvation ligature and lymphatic-block operation in many cases. Recently, I have seen uterine cases treated by starvation ligature by Brown of Detroit, who has had some admirable results.

Referring to Dr. Bonifield's paper, in connection with age, it is well to remember that it is not the number of years we live, but the age of the tissues as a whole and not the passing of the years which is the important factor in disease.

DR. JAMES E. DAVIS, DETROIT, MICHIGAN.—The body resistance may be divided into two types, general and local. The local is involved in the general. All of the speakers have referred to both types of resistance. I wish to call attention to the picture that one sees in the histopathology of these tissues. There is an acquired fibrosis, a change in the blood vessels, and lymph vessels; also a small round cell infiltration. There is some question as to just how valuable the small round cell infiltration is as a measure of resistance, but to my mind it is one of the most positive and reliable evidences of resistance. All of these conditions obtain in cases that are not treated, if the body is able to acquire the ideal of resistance. You may produce all these conditions by the use of slow heat, or radium, or the x-ray, making a replica picture of natural tissue resistance. The same picture is also produced if you deprive the tissues of their blood supply.

I cannot see why there should be many points of difference in regard to the treatment. It is only the problem of application of the treatment to the tissues involved—getting the penetration to the exact area involved in the cancer.

I want to speak briefly in regard to one of Dr. Brown's cases. It was my privilege to study carefully the tissue from one of the cases he has reported. It was interesting to find the occlusion of the blood vessels in all of the tissues involved, and also the cellular change. In many cells there was distention of the cell envelop, in other cells extrusion of the protoplasm, while in some the protoplasm was completely demobilized. In places it was impossible to tell whether the cells were virile, without considering the difficult chemistry of the cell. It was interesting to note the depth of penetration and the change in the cell where the penetration was less deep than in other places. Hence the problem can be summed up in terms of resistance, and the application of the remedy to the most remote parts of the cancer growth.

DR. MILES F. PORTER, FORT WAYNE, INDIANA.—I do not know whether Dr. Bonifield's published paper will contain the statement I understood him to make regarding the possible danger of the publication of facts to the public concerning cancer or not. If it does I think it would be a great mistake for this Association to even seem to support the idea that the public should not know the things that we know regarding the early manifestations of cancer. We lose in the United States about 100,000 people every year from this disease. The increase of cancer has been great until the last year or two, when it has stopped, and it is the opinion of those who know that the reduction, together with the increase in the percentage of cures, that those two favorable changes are due to the fact that the public is coming to understand something more about cancer and presenting themselves to the doctor in time to be cured. I think it would be a great mistake for this Association to even seem to put any drag upon the movement which seeks to get these men and women to the doctor in time to be cured. If we can save 50 per cent of these people we can afford to haul out now and then a few fainting, neurotic patients—male or female.

DR. SKEEL (closing on his part).—It might be thought from some things that have entered the discussion that I had become a radiotherapist. This is not the case, however, as I remain a surgeon although I hope the day will not arrive when I shall be only an operator, and cannot use or advise the use of radium or the x-ray if they offer more hope for the patient than operation, just as I hope the day will not come that I can't listen to Dr. Crile's advocacy of physiological principles in surgery and follow such of them as appeal to my judgment. Also I trust the day will never come when I shall not think of the welfare of the patient as the primary consideration in determining what form of treatment shall be used.

I quite agree with Dr. Noble that radium is an unknown quantity, but such it will remain unless we study it sufficiently to determine its value. Instead of spending time in discussing this phase of the matter at length, however, I prefer to read these letters, since they are of greater value in elucidating the matter than anything I could say, the reading of which was prohibited by the time limitations set upon papers before the Association.

I do wish to insist, however, that we were discussing cancer of the cervix and nothing else.

All of us know the difficulties and dangers encountered in doing a radical extirpation for cancer of the cervix by any method, as well as the high mortality and recurrence rate; and for this reason one phase of the matter was emphasized, that which might be called its sociosurgical aspect, the ultimate effect upon society of unsuccessful operative procedures. For this reason, if for no other, we should in all cases, but the very earliest, abandon an operation which shows so low a final re-

recovery rate and continue our search in other directions until such time as a more satisfactory and successful operation is devised for those plainly diagnosable by clinical methods.

DR. BROWN (closing on his part).—Recently I had a letter from William Mayo in reply to a letter I wrote him regarding their experience with the Percy cautery heat. His reply was that results had been entirely satisfactory in their hands, but as it was more cumbersome than radium, they were employing the latter oftener now only because of its convenience.

I wish to give you some opinions from men like Stone, Clark, Schmitz, Graves and others, to tell the other side. William S. Stone of New York (*Surg., Gynec. and Obstet.*, June, 1921) from observations in over four hundred cases says: "On account of lymph node involvement in certain cases of cancer of the cervix, radium cannot entirely supplant operation in all such early lesions. A strong plea is made to avoid treatment of primary cases that are too far advanced." He further states that the chief error in the use of radium seems to be an overdosage, with the subsequent disastrous results to the neighboring tissues.

Bailey, in a recent article, deals with 336 cases. He says that practically all cases that have a complete radiation of the local lesion and the lymphatics and other involved tissues, pass through a period of improvement, disappearance of ulceration, lessening or disappearance of discharge, gain in weight, and improvement of health are secured in all but the advanced conditions. After a longer or shorter time of well being, many of the cases have further development of cancerous tissue behind the vault of the vagina.

Burrows (*Annual Reports of the Manchester Radium Institute*) states that among 363 cases of carcinoma of the cervix of the uterus that were treated by radium, most of them were inoperable, 10 per cent showed a complete disappearance of symptoms and signs, but at least one-half of them recurred in twelve months.

Clark and Keene (*Jour. A.M.A.*, August 20, 1921), in a list of 313 cases treated with radium, state that in eleven cases, which were advanced when treatment was given, the patients are dead. Also that irradiation is dangerous immediately before or soon after operation, or when employed in fresh operative fields.

Schmitz, reporting 163 consecutive cases (*Jour. A.M.A.*, August 20, 1921) says: "Radiation treatment always causes a decided radiation sickness. During this period the patient could not be safely subjected to the additional trauma of a capital surgical procedure. The operation must be postponed for from three to six weeks, during which time the patient will have recovered from the radiation toxemia. If the operation is performed within a few days after radiation the patient succumbs to sepsis and shock with an alarming frequency. Should the operation be postponed to a later period the same danger is still present on account of necrosis of tissue in the cervical canal, which cannot be avoided. These factors and the intense connective tissue formation in the parametrium, which renders hemostasis difficult, therefore do not let it appear advisable to resort to preoperative radiation."

W. P. Graves (*Surg., Gynec. and Obst.*, June, 1921) speaking from his own experience, states: "It may be said that we have not—so far as we know—cured with radium a single case of inoperable cancer of the cervix." And further, in view of his unfavorable experience with radium, and his favorable operative results, of which he gives statistics, he does not feel justified in substituting radium for radical surgery in cases favorable for operation.

John G. Clark (*Annals of Surgery*, June, 1920) after five years' experience with radium, states that he considers it an adjunct to surgery and that in the certainly operable cases they still advocate a radical operation followed by postoperative radiation. As yet they claim no cures from radium.

Since a permanent cure for uterine cancer by radium has not yet been proved, it seems to me that Dr. Skeel must find himself in the same position that Victor Hugo once found himself when he said, "I stand for a thing which does not exist!" If, however, radium has no other use, as one of our number declared to me this morning, it is an excellent refuge for a coward.

DR. CRILE (closing).—I have nothing to say in behalf of my paper, but I wish to express my great appreciation of the brilliant presentations of my two good friends, Dr. Skeel and Dr. Brown. I am sure before this question is finally settled you will hear many other papers on the same subject.

DR. GEORGE GELLHORN, St. Louis, Mo., read a paper entitled **The New Trend in Gynecological Therapy**. (For original article see page 275.)

DISCUSSION

DR. JOHN O. POLAK, BROOKLYN, NEW YORK.—Personally, I am of the belief that the subjects of obstetrics and gynecology should be combined. My reasons for that are, first, a large amount of our gynecology is the result of our obstetrics. Were it not for the lacerations of the cervix and the incidence of infection, we would not have cervicitis and parametritis. Were it not for the trauma to the anterior vaginal wall by prolonged labor, or administered in the course of delivery, prolapses and displacements would not occur.

Dr. Gellhorn has called attention to the value of radium in myomata of the uterus. I cannot let that pass without a word of warning, namely the danger from using radium in myomata where there is parametrial inflammation, as radium apparently, notwithstanding the observations recently made in Holland, particularly where there is streptococcal infection or the results of streptococcal infection, has the property of lighting up that infection.

His remarks concerning gonorrhea I do not think can be too enthusiastically endorsed. Personally, I feel that all the operations we have done have lost to these women the privilege of ovulation and menstruation. We feel that ovulation without menstruation is very unsatisfactory, that ovulation without menstruation is not cured by all the surgical means we have at hand. Consequently, I have adopted much the same method the doctor has suggested, particularly in gonorrhea, namely to let these women alone and insist on rest at the menstruation period. I shall put into effect his other suggestion as soon as I can try it out. I do know that many patients with definite gonorrheal salpingitis have, eventually, become pregnant and borne children, while the women I have operated never have.

DR. STEPHEN E. TRACY, PHILADELPHIA, PENN.—It is evident that the treatment of carcinoma of the cervix uteri is still under consideration. It is undoubtedly true that in a certain type of simple, uncomplicated fibromyomas radiotherapy will give satisfactory results, but we must not overlook the fact that 30 per cent of these patients, as they come to the surgeon, have either a degeneration in the tumor or a malignancy of the pelvic organs; an additional 40 per cent have closely associated abdominopelvic lesions. This leaves only 30 per cent of simple, uncomplicated cases. It is generally agreed that, in patients under the age of forty years, the treatment should be conservative surgery—myomectomy. In patients past the age of forty years, only 16 to 18 per cent have simple, uncomplicated tumors. By surgery we not only get rid of the tumor, but at the same time remove the associated pathological lesions, and cure the patient of all symptoms in

from 96 to 98 per cent of the cases. Pfahler claims 75 per cent of cures by x-ray treatment. He treats only cases referred to him by gynecologists or surgeons, and, therefore, has simple, uncomplicated cases and I know his results are excellent. As only 18 per cent of cases are uncomplicated, he would cure only 13.5 per cent of the patients as the surgeon sees them. Kelly claims 45 per cent of cures by radium, which is even less favorable than Pfahler's results. The question of what cases should be treated by radiotherapy depends on the diagnosis, and no one can determine with any degree of certainty whether he is dealing with a simple or complicated case.

The radiotherapists say but little about complications. Kelly acknowledges that 8 per cent of his cases subsequently require surgical treatment. Ward reported a case treated by radium in which a loop of bowel adherent to the uterus became necrotic, resulting in a peritonitis and death. The difficulty in diagnosis explains the complications of the radiotherapists. I trust Dr. Gellhorn will tell us, in closing, of his complications.

I endorse what Dr. Polak said about conservative treatment of inflammatory disease of the appendages. Some of these cases will recover and later on bear children; while those subjected to operation seldom do.

DR. HUGO O. PANTZER, INDIANAPOLIS, INDIANA.—Dr. Gellhorn in his clear, eloquent, and rather convincing paper has mentioned that radium is still on probation. I wish to cite a case, recently deceased, of inoperable cancer which had been treated with radium. The patient, cured of the cancer, died within one year with occlusion of both ureters as a result of the fibrosis brought on by the radium. Control, i.e., safe limitation of the radium effect, must be yet achieved.

Regarding the use of radium or x-ray in fibroid tumors of the uterus, we should individualize carefully before applying the remedy which entails sterility. I will cite a given case. Miss H., forty-three years old, came to me suffering from protracted and excessive menstrual flow due to multiple fibroids of the uterus, owing to which the organ extended to the umbilicus, and an associated toxemia, due to chronic suppurative tonsillitis and intestinal (ileocecal torsion) stasis. A swarthy skin and spare body, she looked pitifully "minus." To associate with her the hope of future marriage and motherhood was audacious, indeed! But here was a phase of her history, which induced me to make effort to effect a *restitutio ad integrum*. She was the oldest of seven children, when her father, a wage-earner, had died and had left his family practically destitute. With fine spirit she jumped into the arena; during the day she worked away from home and at night assisted her mother in the manifold duties of caring for her six brothers and sisters. This she had kept up through the long years, uncomplainingly, zealously, and happily, but at the cost of her own health and prospects of life. After due attention was given to her general and throat condition, I surgically removed eight fibroid tumors from her uterus, taking pains to carefully resuture; and, also, cut extensive ileocecal membranes, which were distorting and unfitting for function these anatomical parts. It will suffice to say here, she made a fine recovery, put on the color and spirit of youth again; and, in turn, attracted a fine discriminating man who made her his wife. The culmination of it all: they have a fine boy, two years old now, born unaided *per via naturalis*, and the three constitute a volume of happiness, which, were it to fall out would make this world of ours perceptibly less happy.

DR. GORDON K. DICKINSON, JERSEY CITY, N. J.—I am sure the time is coming when surgeons will rely, more and more, on rest and depend more on physiological means. One of the most distressing things is the operating that is being done, not by true surgeons, but by operators, not men who are going around from school to school to see what they can see and how poor their work may be. For us

to stand up for physiological methods and for time in the treatment of cases speaks well.

DR. FRED J. TAUSSIG, ST. LOUIS, MISSOURI, (by invitation).—I think that one of the good features that will come as the result of the nonoperative trend in gynecology is that women will not hesitate so long before they come to the gynecologist. In the past, how often have we all heard, "Yes, Doctor, I did not come right away because I thought it would be a matter of operation if I was referred to a specialist, and so I put off coming." This fear that nothing but operation will be suggested has deterred many people from coming. Particularly in the case of fibroids I believe we have in radium a treatment for the early stages which will lead to the prevention of these enormous tumors which have come to us in the past.

I do not think we can stress too much the importance of research study in our specialty. The moment you separate obstetrics from its sister branch gynecology you are going to cripple the amount of research study to a very great degree.

As to the indications for treatment, Dr. Gellhorn and I are almost in accord, particularly with regard to the use of radium. My personal feeling is still, however, that in early cervical cancer we should employ operative measures, in association with radium to be sure, but primarily an operative procedure. With the research and educational work that is going on each year, we are getting more and more of the early cases. I believe surgery still has an important place in cervical cancer.

DR. G. VAN AMBER BROWN, DETROIT, MICHIGAN.—The essayist has called attention to the desirability of getting temporarily rid of the menstrual flow in certain pathological conditions. On the other hand, it is often our aim and desire to preserve the menstrual function. I would like to call your attention to a case which brings out the advantage of using ligation and heat rather than radium. The case is one of a young woman, aged twenty eight, a nullipara with advanced carcinoma of the cervix. She was not willing to have her uterus removed, and refused to have anything done that would interfere with her menstrual flow; so we promised not to interfere with that. Had we resorted to radium we know we would have checked the menstrual flow for some months and, possibly, permanently. By doing the ligation and using the heat she made a mighty good immediate recovery with, apparently, a cure. The operation was performed a year ago last August, she has remained perfectly well, has gained twenty pounds in weight, and has not missed a single menstrual period, three days out of every twenty-eight, which is natural to her.

DR. CHARLES E. RUTH, DES MOINES, IOWA.—I had become so thoroughly satisfied with my results in hysterectomy, that I had no hesitancy in recommending any case of fibroid of sufficient size and producing symptoms, to operation. In one case, six years ago, in which a fibroid of large size was becoming a serious matter, I recommended operation which was promptly and emphatically declined. I then turned the patient over, with what advice I felt competent to give, to our roentgenologist who gave her two treatments of heavy cross-fire x-rays, with the result that a careful examination after four years showed the patient practically well with only the slightest vestige of fibroid still recognizable.

The next case of striking possibilities along the same line, came a few months later. This was a patient with a fibroid and the symptom of bleeding had existed for a sufficient length of time and was of sufficient severity to have practically exsanguinated the patient. Her hemoglobin was only 18 per cent. I did not feel justified in attempting a hysterectomy. She was twice transfused in the interim between menstrual periods, and then received x-ray treatment in the same manner as the other case in the hope that we could get a stay of execution sufficient to

permit of a hysterectomy with greater safety. This patient also received two treatments and now, after two years, she has had no hysterectomy and is well.

DR. ROLAND E. SKEEL, LOS ANGELES, CAL.—I desire to offer a word of appreciation. On my way here I stopped at Salt Lake City to read a paper on the limitations imposed upon gynecologic surgery by our present day knowledge of radium therapy. In this I called attention to the fact, that so far as we know definitely at present, there are three gynecological disorders in which we should stay our hands in operating; first, carcinoma of the cervix; second, small fibromata without complications but causing hemorrhage, and third, that condition variously known as hemorrhagic endometritis, fibrosis uteri, and subinvolution, all of course with bleeding as the predominant symptom. I shall be glad to be convinced that there is some way of handling gonorrheal salpingitis, other than by surgery, if that method does not stop ovulation.

By surgical methods one waits until the infection has ceased, then amputates the tubes, and does not remove the ovaries. The recurrent infections, which occur because ovulation and menstruation continue, are, in my opinion, due to persistent cervical infection and, if a high cervix amputation is performed at the same time, I believe we can allow menstruation and ovulation to continue without difficulty. I am afraid of radium in the presence of infection, but I sincerely hope Dr Gellhorn is right, for the further away from surgery we get in cases that can be treated otherwise, the further we remove ourselves from the men who operate indiscriminately.

DR. MILES F. PORTER, FORT WAYNE, INDIANA.—My impression is that real surgeons stopped years ago operating for gonorrheal or any other kind of salpingitis. Real surgeons have not been operating for gonorrheal salpingitis for years and it is wrong to condemn surgery for operations that real surgeons have not, in my estimation, been doing. To operate for gonorrheal salpingitis and to operate for the results of it are two different things entirely, and, if we want to get at the correct solution of this question, we have to stop and figure out exactly where "we are at" and what we mean.

I do not think it is correct to say that one out of every four cases, operated for cancer of the cervix, dies. That is not correct. We will never get anywhere, and stay there, unless we start from a correct premise. One out of every four cases operated for carcinoma of the uterus does not die in the hands of men whose work we look up to. On the other hand, there are multiplied thousands of women throughout the United States, who are bearing children today, who have been operated by good men for the results of gonorrheal salpingitis; and there are other thousands who have been operated for fibroids and are now bearing children.

DR. GELLHORN (closing the discussion).—Dr. Tracy will find the desired information in two previous publications which are referred to in my manuscript. In answer to Dr. Porter's question, I have quoted from H. C. Taylor, of New York. This author has computed a mortality of 25 per cent after the radical operation, and this method is the only one under discussion.

May I interpret your silence as your assent to my first point that gynecology and obstetrics should never and nowhere have been divorced, and that, after the mis-mating of gynecology and surgery has been annulled, the divorced parties should be remarried?

My second point was the growth of nonoperative tendencies in gynecology. After a man has worked a lifetime along surgical lines, it seems hard to have to abandon the altar one has helped to erect and to worship new gods. But it is always thus that the better has to give way to the best, and time will show whether or not the claims of the nonoperative methods are of enduring value.

DR. FRED J. TAUSSIG, St. Louis, Mo., read a paper entitled **The Hypertrophic-Ulcerative Form of Chronic Vulvitis**. (For original article see page 281.)

DISCUSSION

DR. JAMES E. DAVIS, DETROIT, MICHIGAN.—I have had one case which belonged to the diffuse hypertrophic type and the labia and clitoris were involved. The patient was a colored woman and there was a very large number of clearly defined tubercles and giant cells throughout the entire growth.

DR. GORDON K. DICKINSON, JERSEY CITY, N. J.—I would like to ask what relation this lesion has to esthiomene.

DR. TAUSSIG, (closing).—Esthiomene is only another name for this lesion. I believe that the sooner we get a simple name for things the better it will be. This particular type of chronic vulvitis with hypertrophy should be grouped as a part of the chronic affections of the vulva. Of course, in hospital records I suppose it is difficult to avoid the use of special terms.

DR. JAMES E. KING, of Buffalo, N. Y., read a paper on **Strictures and Atresias of the Vagina**. (For original article see page 290.)

DISCUSSION

DR. CHARLES W. MOOTS, TOLEDO, OHIO.—I desire to present the two following cases of congenital atresia of the vagina.

CASE 1: Patient, age twenty-three, rather short and stout with a very short neck. Family history negative except that the patient and a younger sister were both psychoneurotic. She was referred to me by an internist, not because she was sick but because she had been sent to him owing to the fact that she had never menstruated. I found no evidence of endocrine disbalance, the usual growth of hair was present in the axillae and in the pubic region, the vulva and clitoris were perfectly normal. There was present a thin, red streak about two inches long where the introitus should have been. On careful rectal examination I found absence of the uterus, ovary, and tube on the left side; but a small mass, probably an ovary, on the right side. She had never had any violent love affairs, she had no desire to marry, she was happy in her work, and apparently had no sexual feeling. I advised no treatment whatever in this case, except that she return to the village where she was teaching and try to absorb herself in her work.

CASE 2: Patient thirty years of age, married and the mother of two children. She was not brought on account of illness, but because her family physician had found a peculiar condition of the vagina, which was double, the tracts being of about equal size, the septum in about the midline, and deflected to the right side of the cervix, ending in a blind pouch. The doctor said this septum stretched easily on delivery, there was no difficulty whatsoever, and he simply wished to know what to do about it. In this case I also advised no treatment.

DR. FRED J. TAUSSIG, ST. LOUIS, MISSOURI.—I think it is well that Dr. King has emphasized the significance of gonorrhea in children and its seriousness. Having had occasion to be in charge of a clinic for the study of such cases, and having followed them for a long period of time, I am in doubt as to the responsibility of this form of vaginitis as a cause of atresia. Nagel and Veit claimed that

atresia of the vagina was due to an acquired vulvovaginitis in children. That statement has been passed down from year to year and has been accepted by many but I defy anybody to show me proof that vulvovaginitis produces atresia of the vagina. If so, why do we not find strictures of the vagina more frequently? Gonorrhea in children is very common, but Dr. King was able to find only one case of stricture. Why do we not find any intermediate steps in the production of the atresia? If it produces a complete obliteration we should find stricture frequently. We do find it occasionally, I grant you that, but we should find many cases. The development of the hymen shows that there is a tendency for the obliteration of that portion of the tract, and I believe we must accept the theory that these so-called atresias are congenital and are only noticed later in life, because only upon the onset of menstruation do they give symptoms.

DR. IRVING W. POTTER, BUFFALO, N. Y.—I have no cases of atresia to report, probably because most women are pregnant when they come to me. I had the pleasure of delivering both of the patients the doctor mentions. The first by cesarean section, because she had lost her first baby. The second case I delivered without the knowledge of Doctor King. She was seen by him at the seventh month and he thought she could be delivered. I thought she could not be, so I sectioned her with equally good results.

DR. CHARLES E. RUTH, DES MOINES, IOWA.—I wish to speak of two cases, one congenital. Both of these patients were school teachers. One was pregnant and sought to terminate this by the introduction of several $7\frac{1}{2}$ grain tablets of bichloride of mercury into the vagina, with the result that she had mercury poisoning that came near terminating her life. She lost the fetus and she also lost the entire vagina, because it was obliterated absolutely from cervix to vulva, with the exception of a drainage tract too small to permit the passage of even a small probe. After she had suppression of the menstrual flow, her physician persisted until he got a probe in, making an opening which permitted a menstrual flow. This had so contracted when I saw her that it could not be followed by a probe. She insisted on the construction of a vagina but the attempt to reconstruct a vagina from the labia has not, to the present time, been entirely successful.

The other patient consulted me because she did not menstruate. She was normal in development and sexual feeling, masturbated and found great difficulty in controlling that tendency. I could find no sign of a vagina, uterus, and ovaries except that, on the right side, there seemed to be a little thickening or cordlike structure extending from what should have been the top of the vagina. So I presume she had a vestige of an ovary on that side which accounted for her sexual tendencies.

DR. HUGO O. PANTZER, INDIANAPOLIS, INDIANA.—Forty years ago, as a dispensary interne, I had such a case. When first seen by me the patient had been in labor for forty-eight hours with a breech presentation, making little headway against an almost obliterated vagina, owing to scarring by nitrate of silver, which had been used on venereal warts. The dead fetus was finally delivered by embryotomy.

DR. KING, (closing).—As Dr. Taussig has said, it is very difficult to determine with absolute certainty the cause of such atresias as I have described. In every case, unless there is a clear history and record of examination during the presence of discharge, there will always be a question as to the bacterial factor where atresia is discovered later in life. Where atresias are due to streptococcus or diphtheritic infection in childhood there would be a clear history indicating the severe constitutional reaction associated with such infections.

As to the frequency of these atresias we might also ask why strictures of the male urethra do not occur more commonly. It is doubtless true that the vaginal mucous membrane of the child is more resistant to the ulcerative process than the urethra. This subject has been presented with the purpose of bringing to your attention this sequela of vaginal discharge in children to the end that it may prompt a more careful study of such cases.

NEW YORK ACADEMY OF MEDICINE. SECTION ON OBSTETRICS AND GYNECOLOGY. STATED MEETING,
OCTOBER 25, 1921

DR. HAROLD BAILEY IN THE CHAIR

DR. STAFFORD McLEAN reported a case of **Sarcoma of Uterus in Infant**.

He stated that carcinoma of the uterus was extremely rare in infancy and childhood and only twelve cases were reported in the literature. Primary sarcoma of the vagina, however, was not so unusual. The case he reported came under observation in April, 1920, and was followed for sixty-nine days. The baby exhibited pallor and a bloody discharge had been noticed on the diaper for the past two months. The birth weight of the infant was eight pounds; she was born at full term; delivery normal. The baby was fed on milk powder and sugar. The stools had occasionally contained mucus, and blood was noticed two months before. The child had four or five stools daily. The appearance of the infant was that of a well nourished, well developed child. The head was normal, there being no cranial tabes. The heart, lungs and abdomen were absolutely normal. There was no enlargement of the lymph nodes. There was bleeding from the vulva. The blood count showed 2,800,000 red cells and 14,800 white cells. A specimen of the uterine growth was submitted to Dr. Wollstein who reported that it was a sarcoma. There was much infiltration into the surrounding tissues. Radium treatment was given, 100 millicuries for three hours. There was no oozing after the first treatment. Three radium treatments were given, the third being a month after the first. Six weeks from the day of admission the mass was well down in the abdomen and the size of an adult uterus. The child suffered from anorexia, showed extreme pallor, became rapidly weaker and finally died. The autopsy findings confirmed the original diagnosis.

DISCUSSION

DR. HAROLD BAILEY.—One frequently hears of sarcoma of the kidney in young children, but it is extremely rare to hear of sarcoma of the uterus. A feature of particular interest brought out by Dr. McLean was that one child with sarcoma of the uterus had been cured by operation.

The case reported was seen by Dr. Studdiford, Dr. Downes and myself, and we all felt that it was an inoperable condition. Only one finger could with difficulty be inserted into the vagina. By rectal palpation a considerable mass could be felt which extended beyond the outline of the vagina and uterus. Autopsy showed an abscess cavity opening into the vagina and filled with sarcomatous tissue. Treatment with radium was hopeless though we have had some remarkable results in large polyhedral cell growths and in large round cell tumors. As a matter of fact we had one woman with a sarcoma, proved by operation, where the tumor extended into the broad ligament who was treated only by raying with massive doses on the surface and through the vagina. Six months later she was again operated upon in another clinic. The pelvis was found normal. When she learned this she wanted

to bring suit against the original surgeon on the ground that he had performed an unnecessary operation. In radiating this case we used a small silver applicator but could only get a short distance into the vagina, and with the finger in the rectum we determined the location of the capsule. There seemed to be some immediate results. In view of the fact that we were unable to determine what was the proper skin dose, we used $\frac{1}{4}$ the adult dosage of radium from the outside of the abdomen. However, we apparently hit the correct dosage because there was an erythema. At autopsy a small opening into the culdesac was found, and it is possible that the silver wire punctured the wall of the vagina.

Dr. McLean's case is exceedingly interesting inasmuch as it is one of only about a dozen similar cases recorded in the literature. The autopsy findings suggest that possibly the case might have been treated more successfully from the surgical standpoint as the growth was found to be localized entirely around the vagina and cervix.

DR. HARBECK HALSTEAD read a paper entitled, **Pyelitis During Pregnancy.**

This study was based on 24 cases of pyelitis during or immediately following pregnancy, occurring at the Sloane Hospital for Women, from July 1, 1919, to July 1, 1921. The incidence of pyelitis in this period at Sloane Hospital was about 0.7 per cent. The inciting organism was in nearly all cases the bacillus coli communis, mostly alone, but occasionally associated with the streptococcus or staphylococcus. In one case an unidentified organism closely allied to the bacillus coli occurred in pure culture. The most important contributory cause of infection seemed to be an interference with the free outflow of urine from the ureter. Further contributory causes were constipation, bad teeth, infected tonsils, or other focal infections.

There were two types of onset common in this series. First, a slow onset with gradually increasing symptoms. The second, an acute onset with a chill, fever, rapid pulse, and severe pain in one or both costovertebral angles. The slow onset was more common. The more marked general symptoms were: malaise; chills; fever; sweating; increased pulse rate; vomiting; headache; rapid loss of weight. The local symptoms included pain in one or both kidney regions; frequent and painful urination; occasionally, a dull ache in the bladder region; cloudy urine with a foul odor or hematuria. In some patients, there were periods with chills, fever, and other marked symptoms, followed by periods when the patient was entirely or nearly free from symptoms.

The following is the procedure now followed at Sloane Hospital in treating these cases: During the acute symptoms, absolute rest in bed. Raising the head of the bed, and in pregnant patients, if strong enough, the knee-chest posture twice a day for a few minutes. Force fluids. Rapid alkalization of the urine with large doses of alkalis, usually using sodium bicarbonate, a dram every two hours, with one-half dram of sodium or potassium citrate. As soon as the urine becomes markedly alkaline, the amount of the alkalis is decreased by lengthening the time between doses. This treatment often relieves the symptoms, brings down the temperature and clears the urine of pus; but in none of these cases has it rendered the urine sterile.

After the urine has been alkaline from one to two weeks, depending on the symptoms, all the alkalis are stopped, even in the colon irrigations, and hexamethylenamin and sodium benzoate are given, ten grains of each every three or four hours. This is kept up for two weeks, if the patient is improving, and if she shows no signs of bladder or kidney irritation from the hexamethylenamin. Periods

of alkalis and of hexamethylenamin and sodium benzoate are kept up alternately until the patient is well and the urine sterile.

If the patient is not much improved, very soon after the urine becomes alkaline, a cystoscopy should be done and the kidney pelvis washed with an antiseptic, 20 per cent or thirty per cent solargentum or argyrol is usually used. This treatment is repeated from one to three times a week and is kept up until three negative cultures are obtained. As there is nearly always an associated cystitis, the bladder is washed several times before each cystoscopy with boric acid solution, and after the cystoscopy argyrol or solargentum is instilled, to remain in for ten minutes and then to be passed by the patient.

The above treatment has proved satisfactory in the early months of pregnancy and postpartum, but in the later months it has been unsatisfactory, as have all other methods, with the exception of the induction of labor.

If, despite all treatment, the patient grows progressively worse, especially if her pulse rate progressively increases, induction of labor or abortion should be considered. The treatment of these cases should not be stopped as soon as the temperature and pulse are normal and the patient symptomless. It should be kept up until the urine cultures are sterile.

DISCUSSION

DR. HENRY DAWSON FURNISS.—I do not believe that pyelitis is limited to pregnancy or that the pyelitis of pregnancy has peculiarities differentiating it from pyelitis at other times. I think the percentage of 0.7 which Dr. Halsted reports is far less than we have had on the gynecological service at the Post-Graduate Hospital. There is never a year when there are not quite a number of cases that develop pyelitis after operation. When after operation there is a rise in temperature with no exudate, no wound infection and no respiratory trouble, one should be on the lookout for renal involvement. At times the symptoms may be very slight. There may be just slight pain or discomfort in the back and you will find the patient with her hand under her back. This pain may be elicited by tapping the patient on the back or by deep palpation. This pain usually lasts only two or three days. Dr. Halsted spoke of the way in which the kidney became involved. I believe the majority of infections are through the blood stream, but a few show all the evidence of having ascended along the course of the ureter. There will be a slight temperature and pain which gradually goes up along the course of the ureter. It is a question whether the infection ascends along the ureter by the way of the lymphatics or is a surface infection of the mucosa. I believe, however, that as a rule infection is by way of the blood stream; the infection is first in the parenchyma and localizes later in the kidney pelvis. If lavage of the pelvis is instituted during the first few days the results are not very satisfactory because the infection is still localized in the kidney substance. I do not believe the infection is cleared up so much by the antiseptic property of the drugs as by the active hyperemia that is set up.

Dr. Halsted speaks of hematuria and of ecchymotic areas limited to the trigone. It has been my experience that the trigone is no more involved than the rest of the bladder, but if one does a cystoscopy during pregnancy, the bladder walls are so collapsed by the pressure of the enlarged uterus that one does not see the entire bladder wall so easily as in the nonpregnant state. One will find ecchymotic areas all over the bladder wall, which makes one think the infection an embolic process. In one case of pyelitis in which there was hematuria for one or two days I found on cystoscopy that there were as many as fifty ecchymotic areas scattered over the bladder. I believe most of these infections come through the intestinal tract. Kidd claims that bacteria are often carried in the blood stream of every individual, and it is only when there is lowered resistance as from exposure to

cold, wet, or from excessive fatigue, that the organism is unequal to combating the infection.

In the pregnant woman there is greater hydronephrosis than in the nonpregnant, though even in the nonpregnant one finds a moderate dilatation of the pelvis and ureter. In treating a pyelitis the pelvis of the kidneys should be well emptied before introducing the medicament, as such drainage allows the pelvis and ureter an opportunity to contract and regain tone. In pyelitis there is a marked swelling of the mucosa and the good effects of drugs are undoubtedly due to their shrinking the mucosa.

Dr. Halsted spoke of nephrectomy. I do not think we are so radical in regard to nephrectomy as formerly. Often in pyelitis both kidneys are more or less involved, and we feel that conservatism is safer than taking out one kidney and leaving a slightly damaged kidney. It is not a question of the patient standing the operation of nephrectomy, but of getting well with a remaining kidney as badly diseased as the one removed. There are undoubtedly instances of the fulminating type in which nephrectomy is life saving.

DR. A. J. RONGY.—I disagree with Dr. Halsted in several particulars. To my mind the etiology of the pyelitis of pregnancy in a very large number of patients can be traced to a latent pyelitis which either complicated or followed the infectious and contagious diseases of infancy and childbirth. Particularly is this true of patients who have had scarlet fever in a severe form. These patients do well when their system is not unduly strained, but when pregnancy occurs every secreting organ in the body is overtaxed so the latent pyelitis which existed for a great number of years very often assumes an acute aspect and all the symptoms that are associated with it.

Pregnancy very often leads to a mechanical impediment in the flow of the urine through the ureters and in that way will cause disturbance in the pelvis of the kidney. I do not see how washing out of the pelvis of the kidney two or three times a week can benefit the patient, for the involvement of the tissues is very much beyond where the irrigating fluid can reach it. Catheterization of the ureters should be used for diagnostic purposes only. Patients who suffer from pyelitis complicating pregnancy should be kept in a sitting posture as much as possible, for in that way the weight of the pregnant uterus is prevented from pressing upon the ureters at a point where they enter the pelvis.

Operative interference is very seldom indicated in this class of patients. If, however, the patient does not seem to improve, as indicated by constant rise of pulse and temperature, labor should be induced.

DR. WILLIAM H. WELLINGTON KNIPE.—I think the incidence of pyelitis reported at the Sloane Hospital is too low for the reason that they have not reported pyelitis unless a cystoscopic examination had been made. At the Gouverneur Hospital pyelitis is so common that we do not think anything of it. At the Gouverneur Hospital I feel confident that the incidence of pyelitis is five times 0.7 per cent. Our treatment differs a little from that at Sloane. We believe in posture and we give urotropin, not in 10 grain doses, which we think inadequate, but in 60 grain doses daily and enough acid sodium phosphate to make the urine completely acid. With this treatment we have had no occasion to employ lavage of the kidney. We have had cases in which we have used ordinary stock vaccines, and the patients have responded to the treatment. I think we should be conservative in the treatment of these cases. The temperature may keep up for a week or ten days but I have never seen a case that required operative interference.

DR. HERMAN LORBER.—Dr. Halsted said the differential diagnosis of pyelitis was quite easy. I know of a patient seven months' pregnant, who had pain and rigidity in the lower right quadrant and ran a temperature of 103°. The doc-

tor who attended her assured me the urine showed no pus cells. She was taken to the hospital and the blood count showed a high differential count. An operation for appendicitis was performed and perfectly normal appendix removed. A catheterized specimen of urine later showed pus cells. The woman was delivered two months later and made an uneventful recovery. I think it well to call attention to the fact that pyelitis may cause symptoms very similar to those of appendicitis.

DR. HARVEY B. MATTHEWS.—I have had two cases similar to the one just reported in which the symptoms were those of appendicitis, though fortunately the patients were not operated upon. The diagnosis of appendicitis in one case was made by two surgeons and two general practitioners and in the other by two surgeons only. In a third case the diagnosis of pyelitis in a woman six months' pregnant was made just as she was being prepared to be taken to the hospital for an operation for appendicitis. In one of the first two cases mentioned operation was advised, but was delayed. In a short time both patients recovered.

DR. WILLIAM HEALY.—I have been especially interested in listening to the discussion on the treatment of pyelitis because some years ago I heard Dr. Furniss say that practically all cases of pyelitis should be treated by lavage of the kidney pelvis. My experience up to that time had been so uniformly favorable by simple medical treatment without cystoscopy or lavage that I was very firmly opposed to his point of view. But in the last two years I have had three cases that did not respond to the most approved methods of medical treatment in the effort to relieve the pyelitis and relief was only obtained by catheterization and lavage of the kidney pelvis. Then they were so promptly relieved that I am quite convinced that some cases have to have that done in order to be cured.

DR. BAILEY.—I wish to bring out a point merely for reiteration. Of course we have all for years adopted the conservative method of treating pyelitis. As Dr. Healy has said there are very few of these cases in which the kidney pelvis has to be emptied by catheterization. The whole question is what happens to the woman later on; does she develop pyelonephritis or is she cured? Merely because she has no fever does not mean that the pyogenic bacteria have been entirely eliminated. Many may continue to have pyogenic bacteria who feel comfortable and well.

Another important point is the administration of drugs. I question the advisability of giving these drugs for three or four weeks,—hexamethylenamine for two weeks and alkalis for two weeks. I do not see how the stomach can tolerate this treatment for such a length of time, especially when acid sodium phosphate is combined with urotropin.

DR. W. E. CALDWELL.—The small number of really serious cases of pyelitis which have occurred in this series is surprising. It was my impression that a much larger proportion of women during pregnancy would show infection of the pelvis of the kidney. Seven-tenths of one per cent does not seem much higher than the percentage of cases occurring among women not pregnant.

Considering how frequently pyelitis is found among children, I expected that Dr. Halsted would find a past history of pyelitis in a large number of cases,—probably a history of chronic nose and throat infection or acute contagious diseases. However, the majority of patients were clinic cases and it is possible that the histories are inaccurate on this point, but it seems that very few were found who gave a history of previous pyelitis attacks.

I have been impressed in private practice with the frequency of pyelitis in women with faulty development,—the enteroptosis type, who frequently have distorted fascias causing ante flexion of the uterus and distortion of the ureters and who frequently gave a history of dysmenorrhea before pregnancy and marked vomit-

ing in the first three months of pregnancy. It does not seem possible that the weight of the uterus alone will cause an obstruction in the ureter.

I have been desirous for statistics on pyelitis cases from clinics where frequent routine rectal examinations are made throughout labor. If the infection of the kidney pelvis occurs through the lymphatics from the rectum, we would expect a larger incident of pyelitis among cases where unskilled rectal examinations are made.

Unfortunately, Dr. Halsted has not had the cooperation of a good dentist and consequently focal infections in the mouth have not always been checked up with cultures to see whether the same bacteria are found as in the urine culture. Apparently the colon bacillus is frequently found in infections of the mouth.

In the treatment of these cases Dr. Halsted has not become overenthusiastic about any one form of treatment. He has used all the recognized forms of treatment and has individualized his cases. Apparently the infection can be cleared up more quickly with local applications and the establishment of drainage than by purely medical means. It is seldom that a premature labor or abortion becomes necessary in these cases. His "follow-up" on the pyelitis cases is the most valuable part of his work, in my opinion, as it shows how long these infections persist and the necessity of active treatment for a long period of time.

DR. HARVEY B. MATTHEWS read a paper entitled **Pregnancy after Nephrectomy.**

As is well known, after nephrectomy, for any cause, there is a compensatory hypertrophy of the remaining kidney so that the urinary function is not decreased for any length of time after operation, and frequently this hypertrophy has taken place before the diseased kidney has been removed. Physiologists tell us that the total amount of renal tissue possessed by normal individuals is three to four times what is actually needed to meet the ordinary demands of the organism. While chemical and microscopical examination following nephrectomy usually reveals complete return of renal function in some instances, this is not always the case. In a goodly number of nephrectomized individuals albumin is present in the urine many years after nephrectomy. In about 25 per cent of cases of nephrectomy for unilateral renal tuberculosis there is an abnormal condition of the remaining kidney, as is shown by albumin in the urine, irritable bladder, etc. For years there has been the feeling that pregnancy is greatly to be feared in a woman who has had a nephrectomy. In view of these facts the writer has made a study of 200 cases from the literature in which pregnancy occurred following nephrectomy; 37 cases collected in Greater New York, and four cases coming under his personal observation. Before analyzing this series of cases it may be noted that there are two classes of cases in which nephrectomy is performed. In one it is done for pyonephrosis, pyelonephrosis, benign tumor or cyst; in the other for unilateral renal tuberculosis or malignant disease. In the former group the remaining kidney is much more likely to be competent and remain so than in the latter.

In the 200 nephrectomized patients collected from the literature there were 215 pregnancies, in 10 of which there were complications, and two died. In the 37 cases in Greater New York there were 43 pregnancies; five of these pregnancies were complicated by severe toxemia. In the writer's four cases nephrectomy was performed three times for unilateral tuberculosis and one for pyonephrosis; all of these patients had albumin in the urine ranging from 1 to 4 plus. These four nephrectomized women had seven pregnancies and seven living children, with no serious complications. Blood chemistry observations in three of these women, as compared with three nonpregnant women with only one kidney showed the urine to

be normal. Taking these cases all together there was a total of 265 pregnancies with 250 normal labors and two deaths; and 15 labors in which there were complications. From a study of these cases it would seem that pregnancy in the nephrectomized woman is little more hazardous than in normal women, provided the remaining kidney is functioning properly. Albumin occurs in a certain proportion of these cases, usually in the latter months of pregnancy but if treated properly clears up just as in the normal case with two kidneys. In 60 per cent of the cases studied there was albumin from 1 to 4 plus during the latter weeks of pregnancy. Some of the nephrectomized women had albuminuria all through pregnancy. There is little to be said regarding the conduct of labor in nephrectomized patients. They stand morphine and anesthesia well. Chloroform, of course should never be used for reasons needing no elucidation. Chloral hydrate and veronal are badly borne by these patients. Lactation is not interfered with in nephrectomized women, but if the nephrectomy has been done for unilateral tuberculosis or the kidney, lactation should be prohibited. Marriage after nephrectomy is permissible if the remaining kidney has functioned normally for one year or more. If there are symptoms of renal insufficiency in the remaining kidney after marriage, pregnancy should not be allowed to take place and contraceptive methods should be employed. If nephrectomy has been performed for unilateral tuberculosis of the kidney, pregnancy may be permitted provided the remaining kidney has functioned normally for three years or more. If nephrectomy has been performed for a malignant tumor, pregnancy must never be permitted. Finally there is need of a full study of nephrectomized women with well worked up reports of urinary findings and blood chemistry on every case of pregnancy after nephrectomy.

DISCUSSION

DR. A. J. RONGY.—I can very well recollect the first patient who came to engage me for her confinement and who told me that one of her kidneys was removed some three or four years previously. I really was reluctant to accept her. Evidently I was not familiar with the literature on the subject. However, in looking up the literature I quickly discovered that there was really no great cause for alarm, which practically coincides with what Dr. Matthews said tonight. I had three cases of pregnancy and labor in patients with only one kidney. In two the kidney was removed for benign tumors and in one for tuberculosis. One of these patients had a great deal of albumin during the early months which gradually diminished until she reached the ninth month, when it reappeared in large quantities. At one time when the urine contained no albumin she passed as much as 120 oz. of urine in twenty-four hours. I recall a patient telling me that she had had seven children after one of her kidneys had been removed. On the whole it seems to me that these patients stand labor and pregnancy very well.

DR. ALFRED M. HELLMAN.—I have a case of pregnancy following nephrectomy for tuberculous kidney. The right kidney was removed eight years ago. She is married five years and has a child three and a half years old. She is now in the fourth month of her second pregnancy and has no complications in any way related to the nephrectomy. She had a slight uterine hemorrhage during the second month. She has had no albumin in the urine, and her systolic blood pressure has ranged from 95 to 110.

DR. BAILEY.—One case reported by Dr. Matthews is very interesting. When there is an elevation of the nonprotein nitrogen and high uric acid in the blood it is almost certain that the woman has a badly damaged kidney. One can estimate the years of life on the basis of such findings. In cases where the total non-protein nitrogen goes above 100 the patient has a very short time to live.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Selected Abstracts

Carcinoma

Ochsner: Cancer Infection. *Annals of Surgery*, 1921, lxxiii, 294.

People who eat largely of raw vegetables fertilized with human excreta, as the Japanese and Chinese, are very prone to stomach cancer, while the Hindus, who boil all food and water, are practically free from cancer of the digestive organs. In northern Europe, where human excreta are largely used as fertilizer, stomach cancer is much more prevalent than in Russia, Australia and America. The Japanese, who are very cleanly, seldom have skin cancer, which is relatively frequent among the less fastidious Hindus. These figures do not change when these people live together in other countries, e.g. the Philippines.

These and similar data incline Ochsner to the infectious theory of cancer. He holds that such factors as chronic irritation only prepare the soil for the infection.

R. E. WOBUS.

Nuzum: An Organism Associated with a Transplantable Carcinoma of the White Mouse. *Surgery, Gynecology and Obstetrics*, 1921, xxxiii, 167.

Nuzum found a minute, filtrable, gram-positive coccus in the Crocker mouse carcinoma No. 11. It occurred with considerable regularity in all the growths examined. He was enabled to obtain a pure culture of the coccus and found that by injecting this culture subcutaneously, he was able to produce tumors which were practically identical with the original growths, but usually disappeared after a while. These new growths, however, were transplantable, the transplants developing typical carcinomata in 80 per cent of the animals experimented upon.

R. E. WOBUS.

Evans: Malignant Myomata and Related Tumors of the Uterus. *Surgery, Gynecology and Obstetrics*, 1920, xxx, 225.

In the hope of determining the criterion of malignancy, Evans examined a series of 4000 myomata removed at the Mayo clinic. Among these there were 72 cases classed as malignant. These he divides into three groups; (1) those showing from 2200 to 12000 mitotic figures per c.mm.; (2) those having from 200 to 800 per c.mm.; and (3) those showing only an occasional figure or none at all. In this connection it is remarkable that there were none containing between 800 and 2200 mitotic figures.

The number of giant cells varied considerably, but, on the whole the more malignant growths showed the greater number. However they did not occur in any exact ratio to the mitotic figures. Hyperchromatic nuclei, and nuclei elongated and showing direct cell division, occurred frequently, the latter especially in the less malignant forms without mitotic figures.

All recurrences were in Group 1. There were 13 in this group and 11 had recurrences at from one to 18 months after removal. The other two patients were living 4 and 7 months respectively, after operation, too short a time to be classed as cured. The average age of the patients in this group was 50 years, while the average of those in all three groups was 40½ years.

Metastases were not located in any distant organ in any case. Where they did occur, they were found in the pelvis or abdomen.

Evans tentatively classifies tumors of Group 1 as definitely malignant; those of Group 2 as transitional; and those of Group 3 as pre-malignant or having malignant tendencies. He does not believe that these tumors are *a priori* malignant, but that there is a gradual transition from fibroids with very active cell division to the malignant tumor classed as sarcoma. He finds the only dependable feature to be the abundance of mitotic figures in the very malignant cases. Other important features are: (1) The large size of the great mass of tumor cells in a given case and a marked inequality of their size; (2) the relative decrease in the amount of fibrous stroma; (3) the growth among the tumor cells of blood vessels with very thin walls or walls entirely wanting and (4) the relative increase in the size of the nucleus of the tumor cells as compared to the mass of the cytoplasm of the cell body.

R. E. WOBUS.

Berreitter: The Question of the Frequency of Malignancy in Myomata. Zentralblatt für Gynäkologie, 1921, xlv, 1592.

Since the development of conservative methods of treatment of uterine myoma, the question of the frequency of malignancy in these tumors has increased in practical interest and importance, particularly as a diagnosis is in the majority of cases clinically impossible.

Berreitter gives tables from the literature, showing various percentages of malignancy, running from nil (in 1000 cases) reported by Pfannensteil to 10 per cent as reported by Warnekros. In 1905 Mackenrodt suggested from 6 to 7 per cent as a probable figure, but never before had 10 per cent been suggested, and Berreitter undertook to examine a large mass of pathologic material with a view to discovering the actual figures.

In his 716 cases 6 malignant tumors were found, each of which is described at considerable length. In each instance the tumor showed the presence of numerous giant cells. This finding has not been characteristic of other reported cases. The histologic findings on which a diagnosis of malignancy was made in other instances is questioned, notably in the cases reported by Warnekros, 5 of which Berreitter believes to have been benign. He concludes that malignant tumors are *very infrequently* associated with myomas, and that 0.5 per cent is about a true average of incidence; perhaps even this figure is a little too high. Frequently, indeed almost always, in the true malignant

type numerous irregular giant cells are present, and on this a diagnosis may be made. They were present in all of the six cases described by Berreitter.

H. M. LITTLE.

Engelkens: Primary Cancer of the Vagina. *Nederlandsch Tijdschrift voor Geneeskunde*, 1922, i, 27.

Quoted statistics show that primary carcinoma of the vagina constitutes from .26 to 1.5 per cent of all cancers of the female genitalia. The etiology is quite obscure. Carcinoma cells have been found in the ulcers caused by pessaries, but in view of the many women who wear pessaries and the scarcity of carcinoma of the vagina, such a sequence is quite exceptional. The most common form consists of one or more discrete nodules, but there exists a diffuse infiltrating variety which Schlundt found 20 times in a total of 184 cases. While operation, on the whole, has been futile, due in part to the rich network of lymphatics around the vagina, there are authentic cases recorded which were free from recurrence after a period of five years.

Engelkens reviews the various operative measures advocated, especially by the German gynecologists. Though often heroic, they have, on the whole, been quite disappointing, and he feels that the hope of cure lies in radiation, or a combination of rays and surgery, but that it is still too early to judge ultimate results.

He reports two cases, the one, apparently, being caused by lysol. An unmarried woman, being pregnant, went to an abortionist who injected pure lysol into the uterus. The patient experienced acute pain for several days and had continuous bleeding for ten months, when she presented herself at the clinic. At that time, the entire vagina consisted of a diffuse infiltrating carcinoma. R. E. WOBUS.

Zweifel: The Significance of Early Symptoms in the Management of Cancer of the Uterus. *Zentralblatt für Gynäkologie*, 1921, xlv, 1126.

The nonoperative treatment of cancer of the uterus has undoubtedly two great advantages in the absence of a primary mortality and in its painlessness—matters of great import for the laity. The deciding point, however, is the question of absolute cure.

Statistics must be concerned with (1) primary mortality; (2) apparent cure after at least five years; (3) the frequency of operability; (4) absolute cure.

The greatest importance must be placed on whether patients come sufficiently early for treatment. Statistics will have to be altered in future and be arranged to show whether the cases were operable, border-line cases, or entirely inoperable; whether deaths are the results of the operation, or due to intercurrent disease; finally, the frequency of recurrence, and deaths from recurrence.

Zweifel still holds that operation is the best means for the cure of cancer, provided cases may be definitely classed as operable. Inasmuch as primary operative mortality has reached the lowest possible figure, any improvement from the standpoint of operation must depend on early diagnosis—a matter for the general practitioner, but chiefly for the patient herself. That improvement is possible, cannot be doubted.

Zweifel notes especially the importance of the early symptoms, which he believes are not sufficiently considered, e.g., bleeding after cohabitation; bleeding after gentle manipulations during examination; nodules other than follicular cysts on the cervix. In all these, snipping for microscopical examination will help when in doubt. Further symptoms are pruritus vulvae and an irritating discharge, even without the appearance of blood. The public must be educated by means of pamphlets, etc.

Of the greatest importance is the recognition that cancer is a disease of irregular discharge, and in the early stage *without pain*. No physician fulfils his duty by prescribing in such cases without local examination. Cancer may develop absolutely without symptoms before there is an onset of irregular bleeding, and an attempt should be made to overcome the instinctive disinclination of the patient against examination when menstruation or other vaginal bleeding is present (for which the physician is as much to blame as the patient), and, particularly, to spread the belief that any bleeding in the climacteric years should automatically bring the patient to the physician.

H. M. LITTLE.

Winter: Increasing Inoperability of Uterine Cancer and Its Remedy.
Zentralblatt für Gynäkologie, 1921, xlv, 1733.

The inoperability of uterine cancer has increased markedly in Germany since the beginning of the war. This has been due in large part to neglect. Winter has analyzed these neglected cases and found the fault to lie in 74.5 per cent with the patients themselves; in 21.5 per cent with physicians, and in 3.4 per cent with the midwives.

Winter has much to do with the campaign in Germany (commenced in 1904) for the early reporting of cases of carcinoma, and believes that the increasing number of cases of neglect is not directly attributable to war conditions, inasmuch as he gives at length the reasons for delay in bringing patients for treatment. The only hope for improvement is a return to the system of propaganda used before the war, which for a time showed such marked results: wide diffusion of the knowledge of the early symptoms of carcinoma (bleeding after cohabitation; bleeding in the menopause; bleeding with urination or defecation; and bleeding absolutely independent of the ovarian function).

Winter does not agree with Zweifel that pruritus may be an early symptom, but does agree that obstinate discharge may be a sign. With any of the symptoms, positive findings on palpation or inspection indicate a further and more careful examination. Excision and curetting for diagnosis must be more frequently undertaken by the general practitioner.

Statistics on operability are essential, if there is to be improvement. Radiation has given enormous aid to the healing of cancer, and at the moment the primary results of operation are better than ever, thanks to the development of technic. On the other hand, the ravages of carcinoma are as bad as ever. Therefore it is imperative, in order to make any advance, that treatment be undertaken at the earliest possible moment.

H. M. LITTLE.

Highsmith: The Importance of Early Diagnosis of Uterine Cancer. Southern Medicine and Surgery, 1921, x, 521.

The importance of early diagnosis lies in the fact that if the disease is diagnosed in time all patients are curable, while if not diagnosed in time, all must die.

W. K. FOSTER.

Frankl: Early Diagnosis of Carcinoma of the Uterus. Dublin Journal of Medical Science, 1921, iv S., No. 21, p. 491.

After a compilation of the cases of carcinoma of the uterus in Schauta's Clinic at Vienna, Frankl states that early cases showed an increasing proportion from 1909 to 1913; while during the years of the war, the incidence of early carcinoma materially diminished; but is once more, in 1920 and 1921, on the increase—showing that by reason of the economic stress of the war, patients neglected to consult physicians in regard to suspicious symptoms. But circumstances have improved in this regard with the change in economic life. The early cases are those in which the cancer can only be demonstrated microscopically, or those in which the tumor was present without invading surrounding structures. Obviously, the diagnosis depends upon test excision or curettage in all specific cases. The article details the pathologic diagnosis of beginning malignancy.

A. N. CREADICK.

Warthin and Noland: The Differential Diagnosis of Chancre and Carcinoma of the Cervix. The American Journal of Syphilis, 1921, v, 553.

Agreeing with Gellhorn and Ehrenfest, Warthin holds that the primary cervical chancre offers no truly characteristic and pathognostic features clinically, and that the diagnosis and a differentiation from carcinoma can be made only through its characteristic histological picture. The finding of *Spirochetæ pallidæ* in a smear is not conclusive, as a syphilitic woman may have carcinoma of the cervix and it is known that the spirochetes occur in the cervical secretions of syphilitic women. Finding them, however, in the tissues of the characteristic lesions offers valuable confirmatory evidence.

A case is reported substantiating these facts. In a married woman, aged 42, examination revealed a cauliflower growth covering the entire cervix, containing an ulcer which was covered by a grey membrane, the growth bleeding readily on examination. Since the Wassermann test was negative and the appearance of the growth seemed typical for a cervical carcinoma, a panhysterectomy was done in a private hospital. After leaving the hospital, the patient developed secondaries and brought suit against the hospital for \$100,000, on the ground that she had contracted syphilis in the hospital from the needle used in drawing the blood for examination. Her husband brought suit for a like amount, since he had meanwhile also developed evidence of syphilis. The growth was sent to the University of Michigan, where Warthin found it to be a typical chancre of about four to six weeks' duration. He also demonstrated the spirochetes in the tissues. Upon this evidence the suit was lost.

The article contains some exceedingly good photomicrographs, show-

ing in detail the characteristic picture of such a lesion. According to Warthin, the tissue changes due to primary syphilis are more typical in the cervix than in any other tissue.

R. E. WOBUS.

Fink: Early Diagnosis of Chorionepithelioma After the Birth of Viable Children. *Zeitschrift für Geburtshilfe und Gynäkologie*, 1920, lxxxiii, 63.

The author believes that chorionepithelioma develops in all cases in the early months of pregnancy while Langhan's layer and the syncytium are both present. The tumor usually leads to abortion and hence the great majority of cases are reported following abortion or hydatiform moles. Occasionally, however, pregnancy may continue to near term, though the labor is usually somewhat premature. There is frequently atonic bleeding immediately postpartum with acute or chronic hemorrhages in the puerperium and subinvolution of the uterus. Any tissue removed from cases giving such a history should be examined most carefully microscopically with this point in view. The author reports such a case in a twenty-one-year old primipara who had had a severe attack of influenza in the second half of pregnancy. The labor was 3 to 4 weeks premature, severe bleeding followed the spontaneous separation of the placenta. Lochia still bloody and uterus subinvolved on the eleventh day postpartum. Severe hemorrhage on 18th day with removal on 20th day of polypoid growth from uterus, histologically suspicious of chorionepithelioma. Cessation of bleeding until 40th day when she had another severe hemorrhage. Renewed examination of tissue confirmed diagnosis and the uterus with left adnexa was removed by vaginal hysterectomy on the 43rd day.

MARGARET SCHULZE.

Geist: The Diagnosis and Treatment of Chorio-Epithelioma. *Surgery, Gynecology and Obstetrics*, 1921, xxxii, 426.

While adhering to the classification of Marchand, Geist prefers to term typical chorioepithelioma as choriocarcinoma and the atypical form as syncytioma. Between these, there are numerous transition stages and, in addition, there is a form presenting an exaggerated reaction to pregnancy without definite tumor formation, which he terms syncytial hyperplasia.

The diagnosis from curetted or expelled material is extremely difficult except in the clear-cut cases of the two groups. In the transitional types prognosis is doubtful. A positive diagnosis of syncytioma would call for conservatism, yet, the clinical course might still necessitate hysterectomy. In choriocarcinoma and the transitional types, abdominal hysterectomy is indicated and offers a fair prognosis even in the malignant type.

R. E. WOBUS.

Smiley: Prophylaxis in Carcinoma of the Cervix. *New York Medical Journal*, 1921, cxiv, 384.

According to Bland's statistics, one woman of every eight dies of cancer; one-third of all cancers in women are of uterine origin; 85-90 per cent of uterine carcinoma are cervical in type. Cervical carcinomas are found almost exclusively (97 per cent) in women who have

borne children or who have been subjected to some form of cervical traumatism with incidental infection. Chronic endocervicitis is, therefore, definitely a precursor of cervical cancer, and as such should be subjected to surgical treatment, which alone is curative. Low amputation and trachelorrhaphy are not curative. High amputation is frequently followed by serious functional disturbances. The Sturmdorf tracheloplasty operation, on the other hand, removes the entire diseased area, yet leaves the cervical musculature intact. The author has used this operation for eight years in a large number of cases with entire satisfaction. He regards it as an efficient prophylactic of cervical cancer and believes that there is no contraindication to its use during the childbearing age.

MARGARET SCHULZE.

Cullen: Early Squamous-Cell Carcinoma of the Cervix. Surgery, Gynecology and Obstetrics, 1921, xxxiii, 137.

This case represents the earliest carcinoma which has come to the attention of Cullen. An unmarried woman of 46 presented herself on account of uterine bleeding. Curettage showed a glandular hyperplasia of the endometrium with a small area of carcinoma. The curettage was repeated in order to make the diagnosis positive; the second specimen showing typical carcinoma. A complete hysterectomy was done. The uterus contained a submucous fibroid which, together with the hyperplasia, accounted for the bleeding. At the internal os was found a small, wartlike projection, this being the only remaining evidence of the carcinoma.

R. E. WOBUS.

Schweitzer: Attempts to Decrease the Mortality of Operation for Uterine Carcinoma. Archiv für Gynäkologie, 1921, exiv, 213.

The Rumpf-Riess-Wertheim operation for carcinoma of the uterus has increased the proportion of curable cases; but the primary mortality from peritonitis, extraperitoneal sepsis, and pyelonephritis has remained high. It is not possible entirely to abolish peritonitis, because in some cases the infection is in the parametria or the lymphatics; but infection of the peritoneum by the unsterilizable vaginal surface of the carcinoma has been obviated by Zweifel, who after wide extirpation of the diseased pelvic organs, frees the uterus from all but its cuff of vagina. Three sutures are put into the posterior border of the bladder wall, left long, and the free ends put into the uterine wall. The uterus is then pushed down into the pelvis and the peritoneum closed over it. The abdomen is closed. The uterus is easily removed by cutting around the vaginal cuff, and the latter is attached to the bladder with the sutures that were pulled down with the uterus. The wound space above the vagina is filled for 10 days by loosely packed iodoform gauze. The bladder thus has an attachment for efficient contraction and the patient can void, while it is also protected from extension of infection from the vaginal wound.

Within 10 years the Leipzig clinic has employed this method in 322 cases of carcinoma of the uterus, of which 41 involved the body and 281 the cervix. There were 16 deaths, a primary mortality of 4.96 per cent, peritonitis claiming 0.93 per cent.

Among the 281 cases of carcinoma of the cervix, there were 15 primary deaths (5.8 per cent), peritonitis claiming 1.06 per cent and

pyelitis 0.4 per cent (one death, in a case with extensive involvement and suppuration of the bladder); compared with 362 cases of the unmodified Wertheim operation with a primary mortality of 14 per cent, peritonitis 5.8 per cent and pyelitis 1.7 per cent. The Zweifel operation is seldom accompanied by injuries to the neighboring structures (7.5 per cent, while Wertheim himself reports 16 per cent and other operators up to 37 per cent). Peritoneal shock does not occur and $\frac{2}{3}$ of the cases in the series studied made an afebrile recovery.

The operation is not suitable for all cases, especially not when the vagina is small and senile. In about 4 per cent of the cases the difficulty of pelvic hemostasis prevented the modification being used. In about 3 per cent of cases the peritoneal cavity was already invaded by the infected carcinoma and in such cases nothing is to be gained by the Zweifel operation over the Wertheim.

The objections that vaginal hemostasis is difficult and that the operation takes longer, are not valid. The vaginal artery and the communications with the hemorrhoidal vessels may be ligated before the abdomen is closed, and if nothing is left but the vaginal wall to be cut from below there is no hemorrhage. The intraabdominal part of the operation is actually shortened, and the vaginal part can be done after the anesthetic is stopped.

RAMSAY SPILLMAN.

Bonney: The Radical Abdominal Operation for Carcinoma of the Cervix. British Medical Journal, 1921, No. 3183, p. 1103.

Bonney gives a report of 100 cases with an operative mortality of 20, death from recurrence 33, death from other diseases 3, not traced 4, well after five years 40. The author uses spinal anesthesia in conjunction with general anesthesia. Vaginal sterilization with "violet green" has reduced the number of cases of postoperative infections. Without vaginal drainage the patients do better. Operation will endure until some other method of therapy will cure more than 35 per cent of the patients. Radium on the whole has been disappointing.

F. L. ADAIR.

Cunéo and Picot: The Technic of Vaginal Hysterectomy for Carcinoma of the Cervix. Journal de Chirurgie, 1921, xviii, 193.

In an extensive article containing 11 excellent illustrations the authors describe minutely the technic which they employ in vaginal hysterectomy for carcinoma of the cervix. They favor this method above the abdominal route because they find that, especially in adipose individuals, it is an easier and faster operation while at the same time it permits a wider excision of the vaginal cuff. They find also that it does not necessitate the use of such an exaggerated Trendelenburg position, which fact tends toward better respiration, smoother anesthesia and less postoperative shock.

They favor the use of spinal anesthesia aided, where necessary, by small amounts of ether or narcotics. The position used is that of an exaggerated lithotomy with the patient's head lowered slightly and the table of sufficient height to allow the operator to stand.

The main incision is similar to the "Perineal Laparotomy" of Zuckerkandl, and passes from one ischium to the other in a convex line

falling two centimeters below the posterior fourchette. From this point they divide the operation into four main steps. The first is that of separation of the bladder and rectum from the vagina. The next is that of ligation of the various arterial pedicles. At this point the authors call especial attention to the fact that the anatomic relation of the bladder, ureters and uterine arteries is greatly altered by the traction downward on the freed vagina and cervix and the upward pressure on the bladder which is being applied at this time. The arterial pedicles having been ligated and sectioned, the next step, comprising the ligation and section of the various uterine ligaments, is undertaken. Here again they call attention to the rich lymphatic supply of the uterosacral ligaments and plead for as wide an excision of these tissues as possible. The final step is that of closure.

When the malignant process has extended further than was first thought and has invaded the bladder or rectum, and injury is done to these organs by the attempted removal of the cancer, Cunéo and Picot claim that such injury may usually be repaired with a satisfactory result.

The postoperative treatment is simple and consists of frequent catheterization, induced paralysis of the intestines for five to six days, and tampons in the vagina to help hold the vault in place. The tampons should be changed every two days. They find that complete healing usually occurs in from 20 to 25 days.

In the hands of these operators the immediate mortality has compared most favorably with that of the abdominal route, while the ultimate results have been even more satisfactory. T. W. ADAMS.

Adler: The Treatment of Cancer of the Uterus. Wiener klinische Wochenschrift, 1921, xxxiv, 312.

Of 52 cases of inoperable cancer of the cervix treated with radium in 1913 and 1914, thirteen (25 per cent) are still free from recurrence. Of six operable cases treated during the same time only one is free.

The technic of radium treatment is uncertain because there is no definite dosage on account of the impossibility of defining the extent of the disease. Each case is an experiment. If too strong a dose is given severe burning and fistulae may result, if too weak a dose is applied, the growth may be stimulated.

There is a primary mortality with radium treatment, Bumm and Von Schäfern having reported deaths from sepsis following treatment. A large percentage of patients do not return for further treatment, some because they are symptomatically relieved for the time being; some because the severe reaction and pain makes them fearful of another treatment.

The operative treatment has probably reached its highest possibilities. The vaginal operation has a lower primary mortality than the abdominal, being in the last ten years in the Schauta clinic only 3.5 per cent. The five-year cures in the Schauta clinic amount to 22 per cent, in the Weibel (Wertheim) clinic 20 to 25 per cent. The vaginal operation may be used in elderly women, especially under local anesthesia, and when the abdominal route is contraindicated.

The object now must be to combine radiotherapy, x-ray and operation to get better results. Since 1913, 29 cases have had prophylactic

radium treatment four weeks after operation, usually 50 mg. in the vagina for from 10 to 12 hours. Five to six years after operation 58.8 per cent of these were free from recurrence. Of those not having the treatment only 42 per cent were cured.

Eight cases operated on 3 and 4 years ago had 30 to 35 mg. of radium placed in the parametrium on each side at the time of operation for 5 to 8 hours. Of these six (75 per cent) are still living. (The author does not make any statement as to recurrences in these six cases.)

In the last year he has combined operation with radium as above, and intensive x-ray treatment for from 8 to 14 days after operation.

Summary—Every operable case should be operated on, the method, vaginal or abdominal, depending on the custom of the surgeon; the operation should be followed by radium and x-ray treatment.

FRANK A. PEMBERTON.

Seitz: Carcinoma Treatment and Dosage. Muenchener medizinische Wochenschrift, 1921, lxi, 1107.

The author very generally considers chemical and physical irritation in their etiologic relationship to carcinoma. Roentgen rays belong to the latter class and may cause carcinoma, aggravate an existing neoplasm, or kill a malignant growth. The author has studied the effect of the rays with the object of determining the various dosages which will produce these different results and reached the following conclusions: (1) The irritating dose is 35 to 40 per cent of the unit skin dose; (2) The destructive dose is 100 to 110 per cent of the unit skin dose; (3) Between these extremes the dose leads to neither irritation nor to destruction, unless it be repeated, and then it becomes destructive.

S. B. SOLHAUG.

Schmitz: The Treatment of Cancer of the Uterus. Journal American Medical Association, 1921, lxxvii, 608.

Schmitz urges the correction of all pathologic lesions of the cervix and uterus as a prophylactic measure. In operable cases, he urges abdominal panhysterectomy, but limits operability to those cases where the growth is distinctly limited to the uterus. He considers postoperative radiation as useless. His standard dose for inoperable cases is 50 milligrams applied for 30 hours. This he supplements with x-ray treatment. Of 7 operated cases 5 are alive after periods of from one to five years. Of his radiated cases, 161 in all, 27 or 16.8 per cent are alive after the same period of time; this includes also the cases of recurrence, of which only one out of a total of 46 is alive.

R. E. WOBUS.

Frankl: X-ray and Radium Treatment in Gynecology. Dublin Journal of Medical Science, 1921, iv S., No. 21, p. 500.

The author calls attention to the fact that statistics from the clinics of Wertheim and Schauta, where radical surgery for malignancy originated, is a good field for comparison in interpreting the results arrived at by combined x-ray and radium therapy. Admittedly, surgery and the physical methods of treatment have their limitations. In gynecology the treatment is essentially a deep treatment, and for this a powerful dosage is necessary, symmetrically applied over large areas,

guaranteeing deep penetration; he advises 100-110 per cent of the erythema dose of x-ray, cross-fired through three to five avenues of entry on the abdomen, three to four routes from the back, and one or two from the perineum. At the same time 50 mg. of radium element are inserted in the cervix and allowed to remain from 12 to 24 hours. The author demonstrates the action on carcinoma cells removed on different days and from different distances, following radiation. This treatment has shown a small percentage of cures of otherwise inoperable cases, and a decided benefit in preventing recurrence following operation. It is much more readily applicable to cancers of the cervix than it is to cancers of the uterine body, is serviceable in milder dosage for menorrhagic metropathia, and is of use in myomata when the patients are near the menopause with intramural tumors which are not degenerated.

A. N. CREADICK.

Boggs: The Treatment of Carcinoma of the Cervix and Uterus by Radium: Supplemented by Deep Roentgen Therapy. New York Medical Journal, 1921, cxiv, 381.

Results in radiotherapy of uterine carcinoma cannot as yet be definitely formulated. Progress is hindered by the practice of superficial and inadequate radiation so widespread among persons in possession of small amounts of the drug. The Wertheim operation with its high operative mortality shows only a very low percentage of five-year cures. Proper radium treatment locally, supplemented by sufficient cross-firing from radium packs or the x-ray from outside as an anteoperative procedure would cure many more cases. The best results are obtained by the cooperation of a well trained surgeon and a well trained radiologist. Remarkable palliative results are obtained by the use of radium in inoperable cases. The author employs 3000 mg. hours in the vagina, using $1\frac{1}{2}$ mm. brass and sufficient gauze and rubber to make 15 mm. filtration. Three tubes are employed, one directed toward the cervix, one toward each broad ligament. Where it is possible to insert radium in the cervical canal, an additional 3000 mg. hours is given in this way. The local radium treatment should be supplemented by deep Roentgen therapy, for which the author details the technic.

MARGARET SCHULZE.

Graves: Present Status of the Treatment of Operable Cancer of the Cervix. Surgery, Gynecology and Obstetrics, 1921, xxxii, 504.

Graves is not ready to discard the operative treatment of cervical cancer. He feels that, while better results are being obtained from radium, the results from operation are also improving. This he ascribes not only to improvement of technic, both in the application of radium and of operation, but also to the fact that patients appear earlier for treatment. He sums up the situation very aptly in the following words: "Cancer of the cervix uteri, notwithstanding the ghastly consequences of which it is capable, is nevertheless peculiarly amenable to curative treatment in the early stages. Whether the ultimate treatment of curable cases shall continue to be surgical or whether surgery shall yield to radiation, the general outlook is encouraging."

R. E. WOBUS.

Shaw: The Present Position of the Treatment of Carcinoma of the Cervix. *British Medical Journal*, 1921, No. 3183, p. 1101.

The author discusses the present status of therapy from the standpoint of the Wertheim hysterectomy and the use of radium. The author gives his own operability percentage as 26.8. The mortality in 89 cases was 19.1 per cent. Of 59 cases operated over one year, 12 died from the operation; 21 died of recurrence; 26 (or 55.3 per cent) are alive and well. He uses radium only in inoperable cases, but has done the Wertheim operation, after the use of radium, in 10 cases and found increased technical difficulty. He now operates about one week after the application of radium.

Duncan: Uterine Cancer. *Journal American Medical Association*, 1921, lxxvii, 604.

Duncan has treated a total of 236 cases of uterine cancer with radium. Of these, 96 or 40.6 per cent are clinically well after from one year to four years. Of recurrences treated, 22 per cent are well after a period of from one to four years. He advocates the use of radium in all cases of uterine carcinoma, but emphasizes that proper dosage and technic are of utmost importance. He usually employs 200 millicuries with a total dosage of 4000 to 6000 millicurie hours. R. E. WOBUS.

Burrows: The Treatment of Advanced Carcinoma of the Cervix of the Uterus by Radium. *British Medical Journal*, 1921, No. 3170, p. 525.

All cases were inoperable. The author analyzed 100 cases treated from 1916 to 1918. Six are still well after 3 to 3½ years; 5 were well 12 months after treatment. These 5 have not been traced since. Seven were well 3 to 6 months after treatment, also not traced since. Six were rendered operable, and operation was performed. Thirty-two were made comfortable and were able to work for 6 months to 2 years. Twenty-six were not improved, and 16 cases were not followed. The author uses a dosage of at least 120 millicuries for 24 hours.

F. L. ADAIR.

Drueck: Excision of Cancerous Rectum through Vaginal Section. *New York Medical Journal*, 1921, exiii, 21.

Drueck recommends the vaginal route for the perineal removal of carcinoma of the rectum. Section of the posterior vaginal wall and perineum provides ample working space, there is little traumatism and hemorrhage and consequently little shock. The operation is practical only when the tumor is movable and is situated in the lower half of the rectum. If it is as high as the rectosigmoid junction, then the combined abdominal and vaginal operation should be employed. He gives a detailed description of the technic.

MARGARET SCHULZE.

Book Reviews

Pneumoperitoneal Roentgen Ray Diagnosis (A Monograph with Atlas).

By DR. ARTHUR STEIN, M.D., F.A.C.S., Associate Gynecologist, Harlem Hospital and Lenox Hill Hospital, New York City, and DR. WILLIAM H. STEWART, M.D., F.A.C.P. Roentgenologist, Harlem Hospital and Lenox Hill Hospital, New York City. The Southworth Company, Troy, New York. 1921.

The authors describe in detail the method employed by them of inflating the peritoneal cavity with oxygen in order to make the contents of the abdomen capable of transillumination with the x-ray. The procedure was first introduced into this country by them in June, 1919. Practically 17 years had elapsed since Kelling of Dresden first demonstrated the value of inflating the abdominal cavity with air. This author, however, had in mind the visualization of the viscera by means of the endoscope introduced through a small abdominal incision. Jacobaeus later, 1910 and 1911, practiced this new method of laparoscopy and reported his results in 100 cases. The outstanding feature was the absence of any infection as a result of the diagnostic method.

Roentgenologic procedures were adapted to the method of abdominal inflation by Weber in 1912 and by Lorey in the same year. Weber's roentgenograms showed that the following viscera and areas may be rendered visible by means of gas inflation of the abdomen. (1) The liver and spleen as a whole including the region of the gall bladder. (2) Coils of large and small intestine without bismuth filling. (3) The pyloric portion of the stomach. (4) The walls of the stomach and large intestine with gas contents. (5) The bladder filled with urine. (6) Parts of the mesentery. (7) The subphrenic space, not readily accessible to diagnosis. (8) Many intraabdominal tumors. These conclusions were based upon experiments on animals and on fresh cadavers of adults and children. Lorey was the first to demonstrate the diagnostic value of peritoneal inflation and his findings were published in 1912.

Rautenberg in 1914 introduced air into the abdominal cavity in a case of disease of the liver complicated with ascites for the purpose of obtaining more distinct contours of both liver and spleen. About the same time Meyer-Betz recommended withdrawing the ascitic fluid and replacing it very slowly by oxygen injected by means of an ordinary insufflation apparatus such as is used for the application of therapeutic pneumothorax. In 1918 Goetze published very remarkable roentgenographic data obtained by means of the new method and concerning nearly all the abdominal viscera. Other observers were Decker, Kirscher and Alessandrini, who reported on the valuable data arrived at through the employment of the new procedure of induced pneumoperitoneum and roentgen examination. Meantime French investigators reported favorable results; while in this country Alvarez, impressed with "the beautiful plates taken with this method by Drs. Stein and Stewart," recommended the use of carbon dioxide gas (CO_2) because of its rapid absorption (one-half hour as compared to 24 to 100 hours for the oxygen). A. F. Tyler reported his findings in the study of 36 cases and stated that the method proved of great value in making a positive diagnosis of adhesions, early uterine enlargement gastric tumors and gallstones. He points out that the entire kidney, ovaries and tubes can be visualized by these means.

The indication for gas inflation of the abdomen in connection with roentgenology is chiefly in those cases where the clinician is baffled. (1) It is singularly valuable in demonstrating intraabdominal adhesions especially those between the viscera and the abdominal walls. (2) To diagnose cases of early peritoneal tuberculosis and (3) adhesions or the contents of herniated abdominal coverings; (4) diseases of the liver such as cysts, gummas and metastatic tumors are best diagnosticated by this method. (5) Affection of the gall bladder and bile ducts especially gallstones; (6) splenic disease; (7) renal disease. (8) It was especially useful in locating extraperitoneal tumors and in distinguishing whether a projectile is above, within or below the diaphragm and (9) whether a tumor is intraabdominal or intrathoracic when it is situated near the diaphragm. (10) The presence or absence of subdiaphragmatic tumors, abscesses and adhesions and finally, (11) lesions in the pelvis.

The contraindications to the method are chiefly in elderly persons, notably men who have used alcohol in excess, and those suffering from valvular disease and other circulatory diseases. Acute abdominal conditions such as acute appendicitis or peritonitis naturally prohibit the employment of abdominal inflation.

The danger of infection is theoretical because in none of the 150 cases of the authors' experience has this been noted. Puncture of the intestine has been reported as occurring in two cases. In neither of these was any ill effect observed. About one-third of the authors' cases complained of pain in the shoulders, especially the right, following distention of the abdominal cavity with gas. This has largely been remedied by avoiding full distention, by deflating the patient after the roentgen examination, (when oxygen has been used) and by using a gas which is rapidly absorbed, such as carbon dioxide. Superficial emphysema can easily be avoided if one follows exactly the rule stated in reference to introducing the needle into the abdominal cavity before the gas is turned on. Puncturing the epigastric arteries is best avoided by introducing the needle in the median line (linea alba) about two fingers below the umbilicus where there is no artery to be encountered; this technic would also avoid the danger of gas entering these vessels.

The absence of danger from the method is further borne out by the actual therapeutic use of oxygen in certain abdominal conditions. A brief note upon inflation of other body cavities concludes the monograph. Of special interest here is the mention of Stewart and Luckett's case of traumatic fracture of the skull where the ventricles were distended with air following the fracture as demonstrated by the roentgenograph. This experience was utilized by Dandy in outlining roentgenographically the cerebral ventricles by injecting air into the cavities of the brain.

The authors describe the inflation technic and the roentgen ray technic with very illuminating photographs.

The Atlas consists of 34 plates which represent the principal lesions in a beautiful and graphic manner. Explanatory notes are given on pages opposite to the plates in English, French and Spanish. These plates are original photographs and not halftones as ordinarily employed. Naturally this feature makes the price of the book considerably higher than can be met by many to whom the book would be useful. It is to be hoped that this change may be made so as to reach a greater number of roentgenologists and others interested in general diagnosis.

The authors deserve great credit for bringing this valuable method to the attention of the profession; for their personal contributions in the matter of indicated uses and technical improvements, and finally for presenting the method in that clear, concise and compact form in the present volume. As the authors have aptly said, "a great future can be confidently predicted for this interesting method of examination, which during the short period of its existence has already passed through

several phases, with constant enrichment of its diagnostic value or extension of its clinical applicability."

The transuterine insufflation test for tubal patency, while not directly resulting from the authors' publication, was nevertheless made possible by them because the induction of a pneumoperitoneum which in itself is harmless, was the very thing needed to complete the work on tubal patency. It had been possible to demonstrate tubal occlusion by injecting collargol, thorium and bromide solutions into the uterus and then employing roentgenography. To demonstrate patency of the fallopian tubes this method had not proved so satisfactory. With oxygen or CO₂ gas as a medium and the production of a pneumoperitoneum tubal patency is at once demonstrated. Likewise in the event of failure to produce a pneumoperitoneum by injecting the gas into the uterus, tubal occlusion may at the same time be diagnosed. Other features and details of this diagnostic test, such as pressure control, soon developed. The reviewer is glad of the opportunity to record here the fact that his work on tubal patency and tubal occlusion begun by him in 1913 was finally made possible in 1919 when his attention was called to the demonstration given by Dr. Stein and Dr. Stewart of the method of pneumoperitoneum induced by oxygen for general abdominal diagnosis.

I. C. RUBIN.

The Problem of Abortion from the Medical and Legal Standpoints.—

By FRANZ KISCH, M.D., Urban and Schwarzenberg, Vienna, 1921.

This is a well-written treatise of 110 pages, containing numerous references and intended to defend the practice of abortion from various points of view. On page 6 the author says: "It is the duty of the State to guarantee safety and protection to its citizens and to secure the physical and moral well-being of all who are willing to work. Above all, it is the duty of the State to so manage, that a sufficient quantity of food is provided, that in return for work every one may be assured of a sufficiency to satisfy all needs in this direction. If the State is unable to guarantee this, the natural consequence will be, that procreation must be considerably reduced. The amount of available food and procreation . . . stand in direct proportion." The communistic idea that the State must supply food to all who are willing to work, is a Utopian dream which it is not our purpose to discuss here. Referring to the statement, that the amount of available food and procreation stand in direct proportion to each other, one can only say that the facts are against the author. It is common knowledge that the very poor are blessed with large families, while the rich usually boast of but few children.

In the chapter dealing with the indications for the production of abortion and the induction of premature labor, the author seems to go a little beyond the generally accepted medical opinion. He counsels the interruption of pregnancy, if the consent of the patient has been obtained, in the following cases: Organic heart disease, namely valvular lesion, even if perfect compensation exists, pulmonary tuberculosis, nephritis, diabetes, goitre, cirrhosis of the liver, tetany, lupus, extensive varicose veins of the vulva or legs, chronic appendicitis, hernia, abdominal tumors and in absolute pelvic contraction if the patient desires it.

It would take much more space than is allotted to us to take up each one of these indications for criticism. One can hardly refrain, however, from pointing out the very broad indication for abortion when extensive varicosities on the legs is one of them. This is an incident in the majority of pregnancies and if at the behest of all women who have them and desired relief, the pregnancy were terminated, we might become very busy abortionists indeed.

S. D. JACOBSON.

Die Prophylaxe und Therapie der Enteroptose.—By PROFESSOR LUDWIG KNAPP, Prag. Urban & Schwarzenberg, Berlin, 1921.

This is a scholarly and well-written treatise characterized by excellent diction and good literary style. In the chapter on Prophylaxis of Enteroptosis the author points out that inherited weakness of tissues plays an important part in the later development of ptoses. He emphasizes the importance of breast milk in infant feeding and quotes Esser that it is especially harmful to subject milk to prolonged boiling. In this way the constituents of milk are injured and its value as a plastic food diminished. He protests against physical overexertion and mental strain in children and declares that co-education is particularly harmful if girls compete with boys in school. He believes that gymnastics and outdoor sports especially in the winter are beneficial and that swimming is to be highly recommended because the positions assumed counteract the tendency to ptosis.

The author lays stress on the importance of care during menstruation and particularly during the weeks following childbirth, so as to secure proper involution of the genitals and a return to normal of the tension of the abdominal and pelvic musculature. He sounds a note of warning against intensive courses of reduction for obesity especially after the menopause and quotes Menge as saying that nervous collapse and heart failure are to be feared in such cases. In the chapter on therapy the author takes a decided stand against operative interference. He extols the use of mechanical support, massage, general tonic treatment, and in thin, nervous individuals a prolonged rest cure combined with forced feeding.

S. D. JACOBSON.

Item

The Forty-Seventh Annual Meeting of the American Gynecological Society will be held at the Hotel Washington, Washington, D. C., on May 1, 2, and 3, 1922.